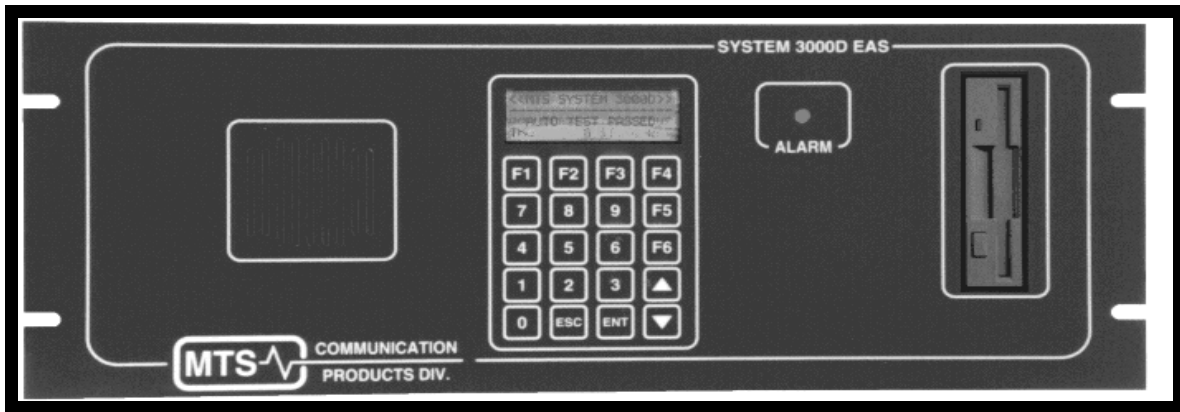


MTS SYSTEM 3000D EAS

MTS COMMUNICATION PRODUCTS DIVISION



Equipment Manual System 3000D EAS

Part Number: 4800-990
Revision 1 Released 12/96

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WARRANTY AND LIMITATION OF LIABILITY

Multi-Technical Services, Inc., hereinafter referred to as MTS, warrants for equipment sold hereunto that for a period of six (6) months for MTS's shipment date that equipment shall be free from defects in material and workmanship and conform to published specifications for the equipment.

If a defect occurs within the warranty period, buyer shall immediately notify MTS and MTS shall repair or replace defective equipment without extra charge.

This warranty does not apply to defects not caused by MTS (for example: lightning damage, accidents or abuse, work or installation done improperly or contrary to MTS standards) or to equipment on which the model or serial numbers, manufacture or shipment dates are changed or removed, or warranty seals broken.

No other warranty, expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose, shall apply.

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FCC Class A Equipment Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Section 1: Introduction to the System 3000D EAS

System 3000D EAS is the complete system level solution for EAS. The system features:

3 Internal synthesized receivers, covering AM and FM broadcast bands, and Weather Radio frequencies.

1 dedicated EAS audio input	3 user selectable Receiver/Audio EAS inputs
Voice Prompted operator interface	Backlit LCD Display
Rugged 20 Key Keypad	Internal Speaker
Audio loop relays with line drivers	Programmable relay contacts (4 Dual Form C's)
1 Line Level Audio Input	2 600 ohm transformer coupled line driver outputs
8 Logic Level programmable inputs	8 Logic Level programmable outputs
Line Driver Outputs for each receiver	2 Serial data ports
1 Parallel Printer port	3.5" Floppy Drive
850 Mbyte Hard Drive	Hours of 15 kHz audio storage/playback
Detachable Terminal Board interconnect	BNC antenna connections
Quiet, fan less design	Flexible, expandable, software controlled system
Standard "AT" type keyboard connector	Optional SVGA video card.

Unpacking the System

The shipping carton contains the following items:

System 3000D
4 Rack mounting screws
Power Cord
Manual
Test Data Sheet

The test data sheet will indicate the part number for the System, which indicates the configuration ordered. Verify that the part number on the test data sheet is the configuration ordered by the following table.

SYSTEM CONFIGURATIONS

System 3000D , no video card, FM FM FM	000
System 3000D , no video card, FM FM NOAA	001
System 3000D , no video card, FM FM AM	002
System 3000D , no video card, FM AM NOAA	003
System 3000D , no video card, FM AM AM	004
System 3000D , no video card, AM AM NOAA	005
System 3000D , no video card, AM AM AM	006
System 3000D , w/ video card, FM FM FM	010
System 3000D , w/ video card, FM FM NOAA	011
System 3000D , w/ video card, FM FM AM	012
System 3000D , w/ video card, FM AM NOAA	013
System 3000D , w/ video card, FM AM AM	014
System 3000D , w/ video card, AM AM NOAA	015
System 3000D , w/ video card, AM AM AM	016

Frequently Asked Questions

Is it a PC? No, it isn't a PC. But it does use technology and components developed for PCS.

Why did we use the PC type technology? Easy! Modern PC technology offers the most versatile and cost effective building blocks for devices that receive, transmit, store, and operate on digital data.

What is the floppy drive for? The floppy drive can be used to transfer EAS log information or to install new software or software options, or transfer configuration information. Installing new software does not require changing any EPROMs, or setting up another PC to program the unit. MTS will offer latest software revisions from both our Internet website, WWW.MTS-COMM.COM, and on diskette from the factory. You can always get the latest software and code changes even after the warranty expires! Any optional modules that are developed in the future will also be available through the same distribution system.

Where is the printer? Doesn't the FCC require that we print the log information? Other units have a printer built in....why doesn't this one? The FCC requires a permanent record of EAS tests and events, both originated and received, but does not specify a printed output. The permanent record is made on the hard drive and can be recalled and examined at any time. If you wish to print the log information, you can connect any standard parallel printer to the printer port on the rear panel, or you can copy the log file to a diskette and print the log information at a PC that has a printer attached. Have you ever tried to read a cash register receipt after its' a year or two old? Just how do you install the cash register receipt type log in your station log? By providing the parallel port that will drive just about any printer from a dot matrix type to a laser type, and by providing the ability to transport the log in a file format, we believe that we have offered the most versatile solution, without locking the user into a special format that requires special supplies and special maintenance.

Why does the unit have a hard drive? My hard drive on my PC has failed several times and I lost so many programs and so much data...it was a disaster! How can this device be reliable for years with a hard drive in it? Easy! In normal operation the hard drive is in the "spin down" mode, which shuts off the drives motor. When the system needs the hard drive, it causes the drive to "spin up" which only takes about 15 seconds. The system has 4 Megabytes of system ram which serves as a buffer during the time the drive is spinning up. In normal operation the drive will spin up once a week for about 15 minutes, which translates into several decades of lifetime for the hard drive. The spin down feature also reduces power consumption by quite a bit.

Why such a high capacity hard drive? 850 Mbytes is twice the capacity of our business computer! EAS primary stations and other origination points will appreciate the ability to prerecord most of their emergency messages prior to needing to send the message. With the System 3000D EAS, several hours of emergency messages can be produced and stored for possible later use. The system also records any attached audio to any EAS or EAN event for delayed transmission. MTS feels that the 2 minutes capacity required by the FCC is not sufficient for all types of emergencies. Some emergencies may require several minutes of audio be attached and re-transmitted.

What is the keyboard connector for? Isn't the keypad on the front panel enough? You can do any operation from keypad, but a lot customers prefer the convenience of a standard "AT" type keyboard. The F1 through F6 keys on the keypad directly correspond to the F1 through F6 keys on the keyboard. Entering text, for such operations as defining special local event codes, is easier if you use a keyboard.

What is the video card option and why would I want video? Is this a character generator card for cable application? The video card option enables the user to connect the system to a standard SVGA monitor. All information that is displayed on the LCD display is presented on the monitor. The video card and monitor are not required, but may be preferred in some applications, such as the "talk show" environment. Other manufacturers sell such options as "message bars", but MTS feels that a plain SVGA monitor can do a better job, in a cost effective manner. In the cable application, the information for the character generator is sent through one of the two serial communications ports.

Just what is this voice prompted user interface? It is similar to the messages on a voice mail system, but in this application the prompts guide the operator through each step. The prompts

are displayed on the LCD display and the video monitor if installed, such that the system is friendly to the hearing or visually impaired operator. The prompts can be made available in any language that can be represented in the Arabic character set. The voice prompt process also converts the EAS header information into plain language so that the operator doesn't have to be familiar with the abbreviations and representations in the EAS header codes.

Are board level outputs for the receivers available? Yes, in fact there is a dedicated 600 ohm balanced output for each receiver that are live at all times.

Why three antenna connectors? Why not have just one antenna? An antenna that works well for high band VHF, doesn't work very well for AM broadcast, and a neither does an FM broadcast band antenna. The best solution is to provide an antenna connection for each receiver, so that the proper antenna solution for each receiver can be implemented.

Section 2: Specifications

Physical

Size: 19.0 inches (W) x 6.95 inches (H) x 16.6 inches (D)
19 inch EIA Rack compatible enclosure

Weight: 12 lbs

Shipping Weight: 18 lbs

Environmental

Storage Temperature	-15 to +65 degrees C
Storage Humidity	0 to 95% non-condensing
Operating Temperature	0 to +50 degrees C
Operating Humidity	0 to 95% non-condensing

Electrical

System

AC Input 115 VAC +/- 15% 60 Hz @ 1 ampere Max.

Encoder

EAS and WRSAME compatible	
FSK Mark Frequency	2083.3 Hz
FSK Space Frequency	1562.5 Hz
Distortion	4% maximum
Output Level	-20 to +8 dBm
Complies with all FCC Part 11 requirements	

Two Tone Attention Signal Generator

Tone A Frequency	853 Hz +/- 0.5 Hz
Tone B Frequency	960 Hz +/- 0.5 Hz
Distortion	4% maximum

Duration	8 to 24 Seconds, programmable in 2 second increments
----------	--

Output Level	-20 to +8 dBm
--------------	---------------

Decoders

EAS and WRSAME compatible

EAS Audio Input Level	-5 dBm nominal accepts -20 to +2 dBm.
-----------------------	--

FSK Mark Frequency	2083.3 Hz
--------------------	-----------

FSK Space Frequency	1562.5 Hz
---------------------	-----------

Complies with all FCC Part 11 requirements

FM Receiver

Supply Voltage	12 Volts DC +/- 0.2 V
----------------	-----------------------

Supply Current	50 mA max.
----------------	------------

Sensitivity	1uV 10 dB S+N/N
-------------	-----------------

Third Order Intercept	-10 dBm
-----------------------	---------

Noise Figure	5.2 dB
--------------	--------

Maximum RF input	+20 dBm
------------------	---------

AM Rejection	34 dB
--------------	-------

THD	-42 dB
-----	--------

Input Impedance	50 ohms
-----------------	---------

Ultimate S/N	73 dB
--------------	-------

AM Receiver

Supply Voltage	12 Volts DC +/- 0.2 V
----------------	-----------------------

Supply Current	50 mA max.
----------------	------------

Sensitivity	5uV 10 dB S+N/N
AGC Range	91 dB
AGC Threshold	30uV
Maximum RF input	+20 dBm
Input Impedance	100 ohms
Ultimate S/N	55 dB
IF Suppression	40 dB
THD	1% for 500mV m=30%
Ripple Rejection	38 dB
Audio Bandwidth	6 kHz

NOAA Receiver

Supply Voltage	12 Volts DC +/- 0.2 V
Supply Current	50 mA max.
Sensitivity	0.5uV 10 dB S+N/N
Third Order Intercept	-22 dBm
Noise Figure	6 dB
Maximum RF input	+20 dBm
AM Rejection	34 dB
Input Impedance	50 ohms
Ultimate S/N	67 dB

Section 3: Installation

Rack Installation

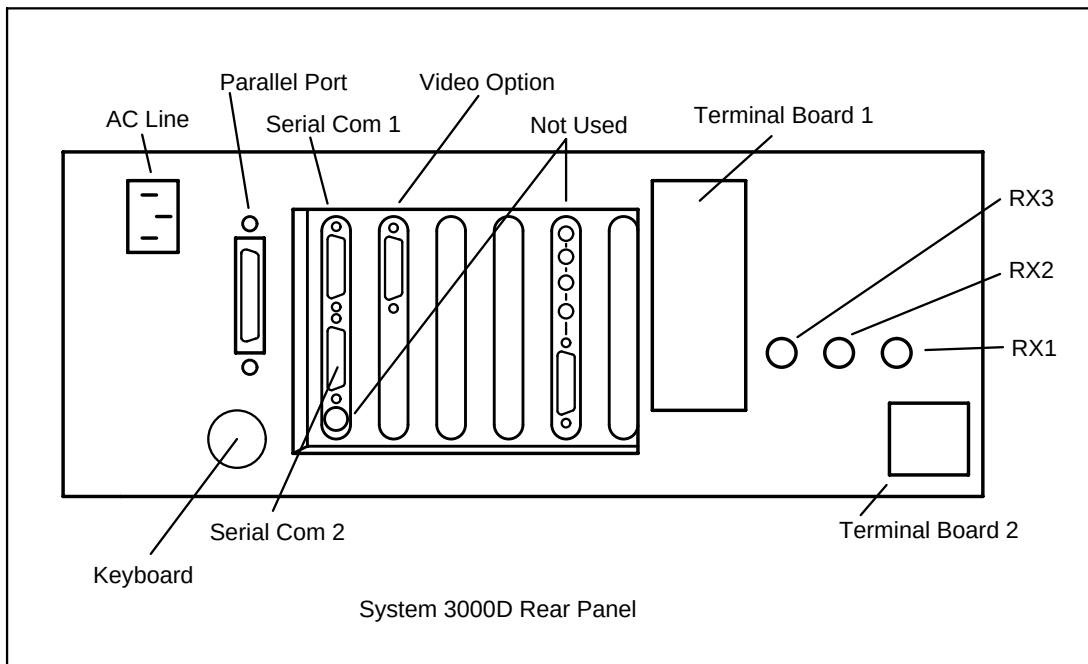
The System 3000D EAS is designed to be installed in a 19 inch EIA standard rack which is grounded to the stations' earth ground connection. Use all four rack mounting screws provided in the accessory kit in the four mounting holes on the front panel. Failure to properly secure all four screws may cause severe damage to the unit.

Antenna Selection

MTS offers three different types of receivers: FM, AM, and NOAA Weather Radio. Each type of receiver will have best performance with an antenna designed for the frequency range for that receiver. The following types are recommended:

FM Broadcast Receiver:	50-75 ohm antenna, omnidirectional or yagi.
AM Broadcast Receiver:	50-100 ohm tuned loop antenna.
NOAA Weather Radio:	50 ohm omnidirectional or yagi.

Rear Panel Connections



From Left to Right

AC LINE INPUT CONNECTOR

The AC Line Input connector is for a standard detachable AC line cord.

Keyboard Connector

A standard AT type keyboard may be connected and used to enter commands at this connector.

Parallel Printer Port

This port may be connected to any standard parallel printer, using a standard parallel printer cable. Log information may be printed to this port.

Serial Communications Port 1

This port is the serial EAS data port. Originated or Decoded EAS data is available at 1200 baud RS-232C at this port.

Serial Communications Port 2

This port is the RS-232C serial data port that may be used for driving an external character generator.

Video Option Port

If the video option is installed, this port may be used to drive a standard SVGA monitor.

Terminal Board 1

Terminal Board 1 has 2 30 position terminal blocks which contain the connections for the program audio loop through circuit, relays, EAS audio input, line input, line outputs, digital inputs, and digital outputs.

TB1

Pin	Description
1	Program Audio Loop Output Right A
2	Program Audio Loop Output Right B
3	Program Audio Loop Input Right A
4	Program Audio Loop Input Right B
5	Program Audio Loop Output Left A
6	Program Audio Loop Output Left B

7	Program Audio Loop Input Left A
8	Program Audio Loop Input Left B
9	Audio Output 1 A
10	Audio Output 1 B
11	Audio Output 2 A
12	Audio Output 2 B
13	EAS Audio Input, Single-Ended. This is the Channel 4 input.
14	Ground
15	Line Audio Input, Single-Ended.
16	Ground
17	Relay K4 Normally Open 1 Contact
18	Relay K4 Wiper 1 Contact
19	Relay K4 Normally Closed 1 Contact
20	Relay K4 Normally Open 2 Contact
21	Relay K4 Wiper 2 Contact
22	Relay K4 Normally Closed 2 Contact
23	Relay K3 Normally Open 1 Contact
24	Relay K3 Wiper 1 Contact
25	Relay K3 Normally Closed 1 Contact
26	Relay K3 Normally Open 2 Contact
27	Relay K3 Wiper 2 Contact
28	Relay K3 Normally Closed 2 Contact
29	Relay K6 Normally Open 1 Contact
30	Relay K6 Wiper 1 Contact

TB2

Pin	Description
1	Relay K6 Normally Closed 1 Contact
2	Relay K6 Normally Open 2 Contact
3	Relay K6 Wiper 2 Contact
4	Relay K6 Normally Closed 2 Contact
5	Relay K5 Normally Open 1 Contact
6	Relay K5 Wiper 1 Contact
7	Relay K5 Normally Closed 1 Contact
8	Relay K5 Normally Open 2 Contact
9	Relay K5 Wiper 2 Contact
10	Relay K5 Normally Closed 2 Contact
11	Opto-Coupled Digital Output 1
12	Opto-Coupled Digital Output 2
13	Opto-Coupled Digital Output 3
14	Opto-Coupled Digital Output 4
15	Opto-Coupled Digital Output 5
16	Opto-Coupled Digital Output 6
17	Opto-Coupled Digital Output 7
18	Opto-Coupled Digital Output 8
19	Opto-Coupled Digital Input 1
20	Opto-Coupled Digital Input 2
21	Opto-Coupled Digital Input 3
22	Opto-Coupled Digital Input 4
23	Opto-Coupled Digital Input 5

24	Opto-Coupled Digital Input 6
25	Opto-Coupled Digital Input 7
26	Opto-Coupled Digital Input 8
27	Ground
28	Ground
29	Ground
30	Ground

RX3

BNC type antenna connector for Channel 3 Receiver

RX2

BNC type antenna connector for Channel 2 Receiver

RX1

BNC type antenna connector for Channel 1 Receiver

Terminal Board 2

Terminal Board 2 has contains a 12 position terminal block that has connections for the following:

Pin	Description
1	Channel 3 Dedicated Monitor Output A
2	Channel 2 Dedicated Monitor Output A
3	Channel 1 Dedicated Monitor Output A
4	Channel 3 Audio Input Single-Ended
5	Channel 2 Audio Input Single-Ended
6	Channel 1 Audio Input Single-Ended
7	Channel 3 Dedicated Monitor Output B

8	Channel 2 Dedicated Monitor Output B
9	Channel 1 Dedicated Monitor Output B
10	Ground
11	Ground
12	Ground

Discussion

AC Line Input: Connect line cord to 115VAC source

Parallel Printer Port: Connect to standard parallel printer, if desired.

Serial Communications Port 1: 1200 baud RS232 port for EAS Data in ASCII format

Serial Communications Port 2: Serial data for character generator

Terminal Board 1

Program Audio Loop Through TB1 pins 1 through 8

The program audio from your console output is connected to the Program Audio Loop Inputs Left and Right. The designations A and B represent the sides of the 600 ohm balanced line. The program audio outputs Left and Right, drive your audio output lines. Be careful to maintain the polarity of each balanced line when making the loop input and output connections.

Balanced Audio Outputs 1 and 2 TB1 pins 9 through 12

The System 3000D EAS has two transformer coupled, balanced 600 ohm line drivers. Received and Transmitted EAS data and audio are available at these ports. The designations A and B refer to the side of the 600 ohm balanced line. These outputs can be used as the source for additional program audio loop through circuits, or to directly drive board inputs, or external recording device.

EAS Audio Input, Single-Ended TB1 pin 13

This input is the Channel 4 EAS decoder input. The input is connected between pin 13 and ground, pin 14. The nominal level for the external source is 0 dBm.

Line-Input, Single-Ended TB1 pin 14

This input is a single ended audio input and can be used to record messages. The nominal input level is 0 dBm.

Relay Connections K3 through K6 TB1 pins 17 through 30 and TB2 pins 1 through 10.

The System 3000D EAS has four user programmable relays, K3 through K6, that are dual form C relays. These relays may be individually programmed from the setup menu to close under various alarm conditions. The relays can be used to turn alarm lights on, remote control interface, or for additional program audio loop through circuits.

Opto-Coupled Digital Outputs TB2 pins 11 through 18

The System 3000D EAS has 8 opto-coupled digital outputs that are user programmable to be active under various alarm conditions. Each output is a diode protected open-collector output. No pull-up voltage is provided. These outputs are rated for a maximum voltage of 20Vdc and a maximum current of 10 mA. In the inactive state, the output will be open. In the active state the output will sink up to 10 mA to ground. These outputs are suited for driving remote LEDs and interfacing to remote control systems.

Opto-Coupled Digital Inputs TB-2 pins 19 through 26

The System 3000D EAS has 8 opto-coupled digital inputs that are user programmable. These inputs can be used to initiate weekly tests from a remote point, enable re-transmit, or reset from alarm mode. To activate the input, connect the digital input to ground.

Remote Control

Software Release V1.0 has basic remote control provisions as follows:

Inputs	Description	Location	
/Send RWT	Send required weekly test	TB2 pin 20	DI2
/Send REAS	Send Received EAS event now	TB2 pin 19	DI1
/Mute	Mute speaker	TB2 pin 26	DI8
Outputs	Description	Location	
/Sending EAS	Sending EAS event	TB2 pin 12	DO1
/EAS Waiting	Ready to send received EAS	TB2 pin 13	DO2

Section 4: Operation

Setup Menu

Access to the System 3000D Menu is password controlled. Press **ENT** (Enter) to get to the Enter Passcode Display

```
.....
• 10N  20N  30N  40FF•
•                                     • Enter Passcode Display
•   MON NOV 04 11:19  •
•*ENTER PASSCODE NOW*•
.....
```

Enter the factory default password, **2995**, to get to the Menu Display

```
.....
• 10N  20N  30N  40FF•
•                                     • Menu Display
•   MON NOV 04 11:19  •
•SEND TUNE SETUP QUIT•
.....
```

Press **F3** to enter the setup menu.

```
.....
•1-SET TIME 4-LOCATNS•
•2-SET DATE 5-EVENTS • Setup Menu
•3-ID-FIPS  6-LOGS   •
•                                     • QUIT•
•                                     •
.....
```

Press **1** to set the system clock.

```
.....
•ENTER 24HR TIME HHMM•
•                                     • Set System Clock Display
•                                     •
•                                     •
•                                     •
.....
```

Enter the correct local time in the 24 hour clock format.

The seconds are set to 00 when **ENT** is pressed to enter the time value. The UP arrow key can be used to backspace.

The Time Zone Menu is now automatically displayed.

```

.....
•1:EST      4-MDT/PST•
•2:EDT/CST  5-PDT      •
•3-CDT/MST  6-SPECIAL•
•              •
.....

```

Time Zone Menu

Select your time zone by pressing the indicated key.

After selecting your time zone, the Setup Menu is automatically displayed. Press 2 to select the Set Date Menu

```

.....
•ENTER DATE  MMDDYYYY•
•              •
•              •
•              •
.....

```

Set Date Menu

Enter the date. The first 2 digits are the month, the second two digits are the year, and the last four digits are the year. Example:

January 9, 1997 becomes 01091997. Press **ENT** to enter the date.

After entering the date, the Setup Menu is automatically displayed.

Press **3** to enter the ID-FIPS Menu.

```

.....
•STATION ID: _____•
•              •
•              •
•      CHANGE      DONE•
.....

```

Station ID Menu

Press F2 to select CHANGE.

The Enter ID Menu is now displayed.

```

.....
• ENTER ID: ..... •
•GHI   PQR   YZ/   •      Enter ID Menu
•DEF   MNO   VWX   •
•ABC   JKL   STU   NUM•
.....

```

Alpha-Numeric Entry. Each character requires 2 key strokes. The first keystroke selects the group of characters above the F key. The second selects one of the nine characters in the group. For example to enter KABC/FM:

```

K      F2,2
A      F1,1
B      F1,2
C      F1,3
/      F3,9
F      F1,6
M      F2,4
      ENT

```

Enter your Station Identification, then press **ENT**.

The Station FIPS Menu is automatically displayed after the Enter ID Menu.

```

.....
•STATION FIPS: _____•
•                               • Station FIPS Menu
•                               •
•   CHANGE       DONE   •
•                               •
.....

```

Press F2 to select CHANGE. The Enter FIPS menu is displayed.

```

.....
• ENTER FIPS: _____•
•                               • Enter FIPS Menu
•                               •
•                               •
•                               •
.....

```

Select the FIPS code for your area from the FIPS CODE Section of this manual, and enter the code followed by **ENT**.

The Originator Code Menu is automatically displayed after entering the FIPS code.

```
.....
•ORIGINATOR CODE: ...•
•                      •
•                      •
•      CHANGE      DONE•
.....
```

Originator Code Menu

Press F2 to enter the Change Originator Code Menu.

```
.....
•ORIGINATOR CODE: ...•
•1-EAS  2-CIV  3-WXR •
•                      •
•                      DONE•
.....
```

Change Originator Code Menu

Select the originator code by pressing 1,2 or 3. The Setup Menu is now automatically displayed.

Press 4 to enter the LOCATIONS MENU

```
.....
•
•000000, ALL USA,    •
•                      •
•      ADD  DEL  QUIT•
.....
```

Location Menu

Press the UP and DOWN ARROW keys to scroll through the list of selected counties and areas. The selected counties and areas are the counties and areas that the unit will automatically respond to. Press F2 to ADD a new county. The ADD FIPS MENU is now displayed.

```
.....
•  ADD FIPS:----- •
•                      •
•                      •
•      ADD  DEL  QUIT•
.....
```

Add FIPS Menu

Select the FIPS code for the county you wish to add from the FIPS CODE index in this manual. Enter the FIPS Code and press ENT. The System 3000D verifies that the code entered is a valid code and then displays the FIPS code, county name, and state. As many counties and areas can be entered as desired. Press F3 to DELETE the displayed county or area and remove it from the "respond to" list. Press F4 to quit when done editing. The Setup Menu is now displayed. Press 5 to enter the EVENTS MENU.

```

.....
•EAN EMER ACTN NOTIF •
•DELAY 1 SECONDS •
•
• CHANGE DONE •
.....
Events Menu

```

Use the UP and DOWN arrow keys to scroll through the list of selected events. The displayed event codes are the preselected events that the System 3000D will respond to. The delay time is the time until the received event is automatically retransmitted. The minimum delay time is one second and the maximum delay time is 15 minutes (900 seconds). The ability to assign a different delay time to each event is a very powerful tool. For a TORNADO WARNING, you may wish to set the delay to 1 second, which prevents your operator from delaying retransmission of this information, while the delay for a THUNDERSTORM WATCH may be set to 15 minutes, to allow the operator or automation to transmit the message at the most convenient time. Carefully consider each event type and the response time that will be most applicable to your facility.

Press F2 to enter the CHANGE DELAY MENU.

```

.....
•FLW FLOOD WARN •
•ENTER DELAY ... •
•
•
•
.....
CHANGE DELAY MENU

```

Enter the desired delay for the displayed event and press ENT.
Press F4 when done editing. The Setup Menu is again displayed.

The following Event (EEE) codes are presently authorized:

EVENT	CODES	Nature of Activation
EAN	1	Emergency Action Notification (National only)
EAT	2	Emergency Action Termination (National only)
NIC	3	National Information Center
NPT	4	National Periodic Test
RMT	5	Required Monthly Test
RWT	6	Required Weekly Test
TOA	7	Tornado Watch

TOR	8	Tornado Warning
SVA	9	Severe Thunderstorm Watch
SVR	10	Severe Thunderstorm Warning
SVS	11	Severe Weather Statement
SPS	12	Special Weather Statement
FFA	13	Flash Flood Watch
FFW	14	Flash Flood Warning
FFS	15	Flash Flood Statement
FLA	16	Flood Watch
FLW	17	Flood Warning
FLS	18	Flood Statement
WSA	19	Winter Storm Watch
WSW	20	Winter Storm Warning
BZW	21	Blizzard Warning
HWA	22	High Wind Watch
HWW	23	High Wind Warning
HUA	24	Hurricane Watch
HUW	25	Hurricane Warning
HLS	26	Hurricane Statement
TSA	27	Tsunami Watch
TSW	28	Tsunami Warning
EVI	29	Evacuation Immediate
CEM	30	Civil Emergency Message
DMO	31	Practice/Demo Warning
ADR	32	Administrative Message

Press 6 to enter the LOGS Menu.

From the Setup Menu, Press **6** to select the LOG Menu.

```

.....
• COPY EAS LOG TO •
•1-PRINTER 2-DISKETTE• LOG Menu
•3-DISPLAY 4-PR SETUP•
• QUIT•
.....

```

Pressing 1 will print the EAS LOG to the parallel printer port.

Pressing 2 will copy the EAS LOG FILE to the Floppy Disk Drive.

Pressing 3 will display the EAS LOG.

Pressing 4 will print the System Setup to parallel printer port.

```

.....
•COPYING EAS LOG TO •
• PRINTER • Printing EAS LOG Display
•....PLEASE WAIT....•
• •
.....

```

```

.....
•COPYING EAS LOG TO •
•   DISKETTE       •
•....PLEASE WAIT....•
•                  •
.....

```

Copying EAS LOG to Diskette Display

```

.....
•<1>RECEIVED ON MON 0•
•1-01-99 ZCZC-WXR-T0R•
•-037181+0015-3091842•
•NEXT PREV          QUIT•
.....

```

Display EAS LOG

The first EAS event displayed is always the last event. To view a previous event press **F2**. To advance the display from a previous event, press **F1**. To Quit, Press **F4**.

```

.....
•PRINTING 3000D SETUP•
•                  •
•....PLEASE WAIT....•
•                  •
.....

```

Printing Setup Display

Originating EAS events.

Press **ENT** and enter the password, **2995**, to get to the Menu display.

```

.....
• 10N  20N  30N  40FF•
•                  •
•  MON NOV 04 11:19 •
•SEND TUNE SETUP QUIT•
.....

```

Menu Display

Select SEND by pressing **F1**.

```

.....
•--SELECT EAS EVENT--•
•EAS EMER ACTN NOTIF •
•USE ARROWS TO CHANGE•
•                  QUIT •
.....

```

Select EAS Event Menu

Use the **UP** and **DOWN** arrows to select the EAS event. Press **ENT** when the desired event is selected.

```

.....
•--SELECT LOCATIONS--•
• 037183, WAKE •      Select Locations Menu
•USE ARROWS TO CHANGE•
•           QUIT •
.....

```

Use the **UP** and **DOWN** arrows to select the location. Press **ENT** when the desired location is displayed. Pressing ENT adds the displayed location to the affected location list. This is indicated by a + character before the FIPS code for the location.

```

.....
•--SELECT LOCATIONS--•
• +037183, WAKE •      Select Locations Menu
•USE ARROWS TO CHANGE•
•DONE           QUIT •
.....

```

Press **F1** when DONE.

```

.....
•--SELECT DURATION--•
•00:15 •      Select Duration Menu
•USE ARROWS TO CHANGE•
•           QUIT •
.....

```

Use the **UP** and **DOWN** arrows to select the Duration of the event. Press **ENT** when the desired duration is displayed.

```

.....
•SELECT AUDIO SOURCE •
•           •      Select Audio Source Menu
•           •
•REC NONE           QUIT•
.....

```

Press **F1** to RECOrd an audio message to be attached to the EAS data. (The audio input for recording is TB1 pins 15 (+) and 16 (-), which is a single ended input. Nominal level is 0 dBm.)
Press **F2** for No attached audio.

```

.....
.
. >>>RECORDING<<< .
.
. STOP .
.
.....

```

Recording Display

Press **F2** to STOP the recording.

```

.....
.
.
. READY TO SEND .
. SEND QUIT .
.
.....

```

Ready to Send Display

Press **F1** to SEND the EAS Message.
Press **F4** to QUIT.

```

.....
. SENDING EAS MESSAGE .
.
. SENDING EAS DATA .
. CANCEL .
.
.....

```

Sending EAS Display

Press **F4** to CANCEL.

Tune Menu.

Press **ENT** and enter the password, **2995**, to get to the Menu display.

```

.....
. 10N 20N 30N 40FF .
.
. MON NOV 04 11:19 .
. SEND TUNE SETUP QUIT .
.
.....

```

Menu Display

Select TUNE by pressing **F2**.

```

.....
.
•<F5> TO SET INPUTS •      Tune Menu
•SELECT RADIO TO TUNE•
•RX1    RX2  RX3 DONE •
.....

```

Press **F5** to setup the inputs.

```

.....
•SOURCE 1 : FM BDCST •
•SOURCE 2 : AM BDCST •
•SOURCE 3 : WX / VHF •
•SRC1 SRC2 SRC3 QUIT •
.....

```

Source Setup Menu

Press **F1** to set Source 1 to the configuration type. The selections for sources 1 and 2 are AM, FM, or External Audio. Source 3 has the additional selection of WX / VHF (Weather Radio). The sources must match the receiver modules installed in the unit.

F2 toggles the Source 2 configuration and **F3** toggles the Source 3 configuration.

Press **F4** to QUIT when done.

From the Tune Menu, press F1, F2, or F3 to tune RX1, RX2, or RX3.

If Source 1 is configured as an FM Broadcast receiver, the tuning menu for RX1 looks like this:

```

.....
•SELECT FM FREQUENCY •
•101.5 MHZ           •      RX1 Tune Menu (for FM )
•                     •
•               QUIT   •
.....

```

Use the **UP** and **DOWN** arrows to select the receive frequency. Press **F4** to QUIT.

Press **F4** to return to the normal state.

Receiving and re-transmitting EAS messages

When EAS data is received on any source, the unit displays Receiving EAS Header.

```
.....  
•  
•Receiving EAS Header•  
•  
•  
.....
```

Receiving EAS Header Display

If the header, event, location, and time codes are valid and the message is not a duplicate, then the ALARM LED is turned on. The unit automatically records any attached audio and stores the entire message for transmission. After the message has been received in its entirety, the system displays the receive EAS menu.

```
.....  
•AUTO-SEND IN 120 SEC•  
•  
•  
•VIEW HEAR FLUSH SEND•  
.....
```

Receive EAS Menu

Press **F1** to VIEW the message.
Press **F2** to HEAR the attached audio message.
Press **F3** to FLUSH (discard) the event.
Press **F4** to SEND the message now.

The Auto-Send timer indicator indicates the remaining time before the message will automatically be sent.

Installing Software Updates

Enter the passcode menu by pressing ENT and entering the passcode, 2995. Install the software update diskette in the floppy drive. (Top of the diskette goes to the right). Press F6. New software is being uploaded to the system.

Software updates will be available on the MTS Website at WWW.MTS-COMM.COM, as well as advisories concerning updates. Look for release 2.0 in mid January, which will include multi-station operation, voice-prompts, and serial drivers for character generators.

Software updates are also available on diskette from the factory. Call Customer Service at (919) 553-2995 for further information.

Section 5: Hardware

The System 3000D EAS hardware includes the following assemblies:

Assembly	Manual Section	Assembly Part Number
Power Supply	Section 5.1	4800-060
Floppy and Hard Drive	Section 5.2	4800-061 Floppy 4800-062 Hard drive
Processor Assembly	Section 5.3	4800-063
Decoder Assembly	Section 5.4	4800-100
I/O Assembly	Section 5.5	4800-200
Receiver Mother Board	Section 5.6	4800-600
NOAA Receiver	Section 5.7	4800-300
FM Receiver	Section 5.8	4800-400
AM Receiver	Section 5.9	4800-500
Display Assembly	Section 5.11	4800-800
Terminal Board 1 Assembly	Section 5.12	4800-900
Terminal Board 2 Assembly	Section 5.13	4800-700
Wiring and Interconnect	Section 5.14	4800-070
Adjustments	Section 5.15	

Each assembly is discussed in detail.

Section 5.1: Power Supply

The power supply for the System 3000D EAS is a high efficiency, convection cooled, switched mode 60 watt supply. This module provides regulated +12, +5, and -12Vdc for the entire unit. The AC line fuse is located inside the power supply assembly. The nominal input voltage is 115 VAC, but the supply remains in good regulation from 90 VAC to 150 VAC.

Section 5.2: Floppy and Hard Drives

The System 3000D EAS contains a Sony MPF520 3.5" Floppy Drive and a Western Digital Caviar AC2850 850 Megabyte Hard Drive (or larger capacity). Both drives are installed in the drive bracket located on the front panel assembly, and both are controlled by the IDE controller section of the processor assembly.

All program information, data, logs, configuration, and audio files are stored on the hard drive.

During normal operation, the hard drive is in a standby mode or "spin down" mode. This mode is used to extend the life of the hard drive from 2 years to approximately 100 years.

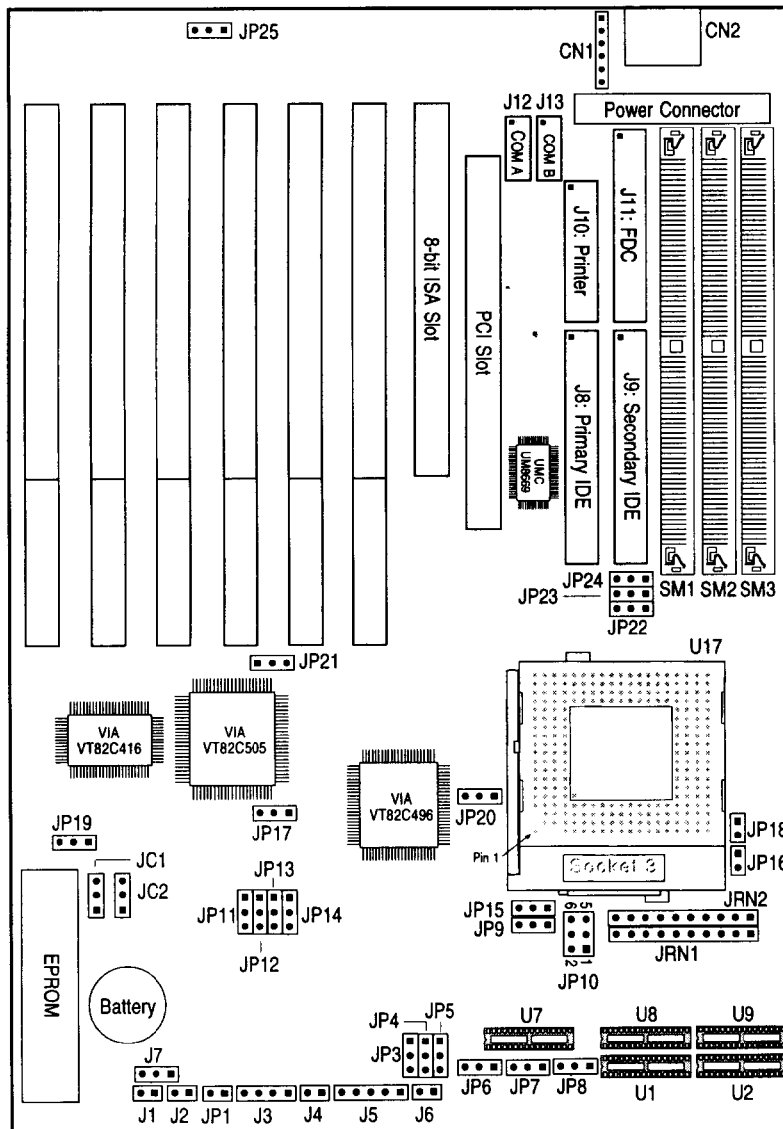
The floppy drive is used to load new operating software and modules into the 3000D as well as to copy files such as configuration and log files for transport to other systems.

The processor board is configured for the drives installed at the factory. Do not replace the drives with any drive except a pre-loaded and configured factory replacement.

Section 5.3: Processor Assembly

The processor assembly is a Diamond Flower G486VPC controller board, with 6 16 bit ISA slots, 1 8 bit ISA slot, 1 PCI slot, 2 serial ports, 1 parallel port, 2 IDE controller ports, and one floppy port. The controller is based on a 80486DX2 66 MHZ processor and the VIA chip set. The processor assembly is equipped with 4 Mbytes of system DRAM.

Board Layout



Section 5.4: Decoder Assembly

Decoder Assembly 4800-100

Overview

The Decoder Assembly provides the following functions: 4 independent EAS decoders, Receiver control data, audio level detector for channel 4, LCD driver, keypad interface, and ISA bus interface.

Specifications

Operating Temperature	0 to +50 degrees C
Operating Humidity	0 to 95% non-condensing
Supply Voltages	+5 Vdc @ 0.25 amps max +12 Vdc @ 0.1 amps max
EAS Audio Input Level	-5 dBm nominal will accept -20 to +2 dBm.
FSK Mark Frequency	2083.3 Hz
FSK Space Frequency	1562.5 Hz
LCD Interface	HD44780 compatible
Keypad Interface	5 Row by 4 Column
Audio Level Detector Threshold	-2 dBm

Discussion

ISA Bus Interface

The ISA Bus Interface consists of four basic sections: Address Buffer, Directional Data Buffer, Card Address Decoder, and Read/Write Decoder.

The Address Buffer consists of U1, U4, and U7, which are 74HCT245 directional octal buffers. This section is used to buffers address lines A0 through A19, Address Enable, /IOW, /IOR, and the ALE outputs from the PCS ISA slot.

The Directional Data Buffer section consists of U2 and U3, which are 74HCT245

directional octal buffers. Data lines D0 through D15 are buffered and directed either to the PC or to the card. The direction of the data is determined by the state of the buffered /IOR signal. The buffered data lines are terminated by resistor packs R50 and R51.

The Card Address Decoder, U8, 74F521, compares buffered address lines BA5 through BA9 on the Q inputs of the 8 bit comparator against a preset code on the P inputs. When the value of BA5 through BA9 is equal to the corresponding P inputs and /BAEN is low then the output of U8 is low. This signal is used to enable the R/W decoders, Direction Data Buffer, 16 bit I/O enable (through U9:B) of the PC.

The R/W decoder sections, U5 and U6, are 74HCT138 3 to 8 line decoders. U5, the Read Decoder is enabled by the Card Address decoder output being low and the /BIOR signal being low. The value of the data on the Y outputs is determined by the value of the BA4 signal. The state of BA1 through BA3 determine which output is active. U6, the Write Decoder, works the same way, but the second enable signal is the /BIOW signal.

LCD Interface

U20 and U24, 74HCT374 latches, are enabled by /WR P18 from the write decoder. U24 latches data bit D0 through D7, character information, to the display port, J4. U20 latches data bits D8 through D10 to the displays' Reset, R/W, and enable inputs. U20 also latches D11 to the Alarm LED output on J4. Pot R7 controls the contrast of the LCD display module. R8, R9, and R10 terminate the latch outputs.

Keypad Interface

U26, 74HCT374 latch, is enabled by the /WR P1A signal from the write decoder. D0 through D4 drive the Row outputs at J4 through series resistors R16, 17, 18, 20, and 21. U11, 74HCT244 switch, is enabled by the /RD P1A signal from the read decoder. The column inputs, C1 through C4, are terminated by R30, 31, 32, and 33. If no key is depressed D0 through D3 returns a low value. If any key is pressed, a Hi value will appear on the Column input when strobed by the Row, which gives the key value.

Audio Level Detector

The channel 4 audio level detector starts with a audio amplifier op-amp, U31:A. R28 provides isolation from the associated decoder, C39 provides AC coupling. R26 and R27 set the gain of the amplifier to a value of 10. R38, 39, and C41 provide a filtered analog reference voltage. R35 couples the amplifier to the peak rectifier U31:B and D1. C47 and R40 form a filter that determines the decay time of the detector. R37 limits the charge current to C47. The resulting DC voltage, which is proportional to the audio input level is compared against a threshold determined by R47 and R49 by comparator U35. C53 filters the reference voltage and hysteresis is provided by R48. R42 is the

pull resistor for the comparators' open collect output. The threshold of the audio detector is -2 dBm.

Receiver Control Data

All receiver control data, as well as status information and audio select controls, are sent and received as a 16 bit word. U13 and U17, 74HCT374 latches, are enabled by the /WR P10 signal from the write decoder. Data to each of the receivers, through J2, is actually in a two line serial format, with one bit being the data, and one bit being the clock for that data. The last 4 outputs from U17 are used to reset the RDAV (reset data available) input to each of the EAS decoders.

RSSI and Audio Level OK information comes from the Receiver Mother Board Assembly to J2 and then to U23. U23, 74HCT244 switch, is enabled by /RD P18. Receiver and audio status along with DAV (data available) from each EAS decoder is sent as a 16 bit word.

EAS Decoder

Four identical EAS decoders are housed on this assembly. We will discuss the operation of the first section only. The EAS decoder consists of three sections: FSK demodulator, Serial to Parallel Converter/Decoder, and Data Switch.

FSK Demodulator

The FSK demodulator is based on an XR2211 IC, U12. C13 provides AC coupling to the demodulator input. C16 and R6 form the lock filter. C15 filters the internal analog reference voltage. The loop detector filter is formed by C14, R2, and R3. C12 is the timing capacitor.

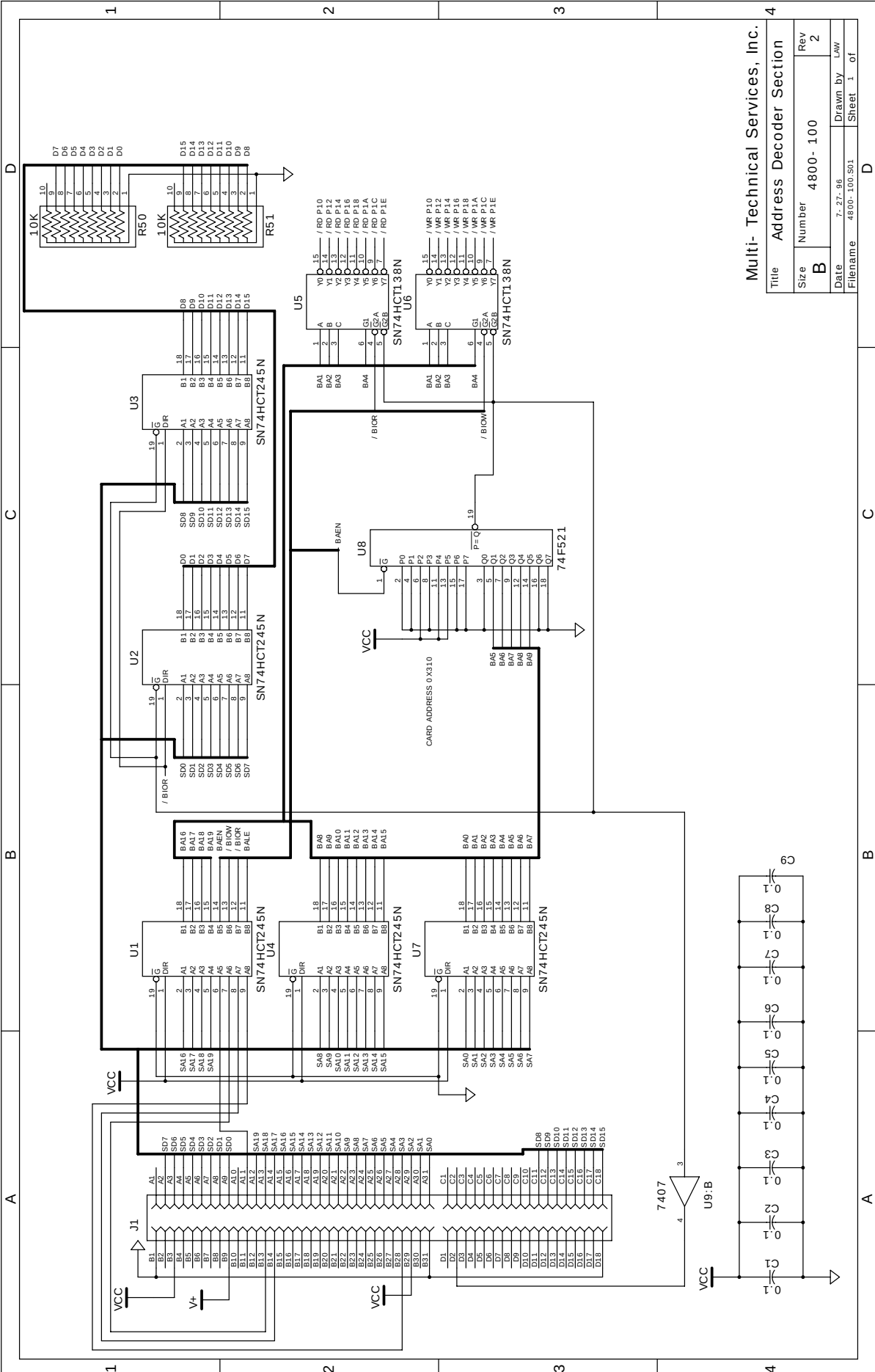
The detector output is coupled to the comparator by R13. C17 determines the attack/decay time and R5 provides hysteresis. Note that all of the timing and filter capacitors are high stability polyester types. The demodulated data is available at pin 6 and 7.

Serial to Parallel Converter/Decoder

The recovered EAS data from the FSK demodulator is directly coupled to pin 21 of imbedded controller U12. The EAS data format is not typical serial data....there is no start bit, no stop bit, no parity, and no synch clock. An MTS proprietary program in the imbedded controller converts the EAS data to standard parallel data that is available at port C of the micro-controller. The clock for each of the micro-controllers is located at U34. X1, a 3.58 MHZ crystal, controls the oscillator. C44 and 45 provide the load C for the crystal. R36 limits the crystal dissipation.

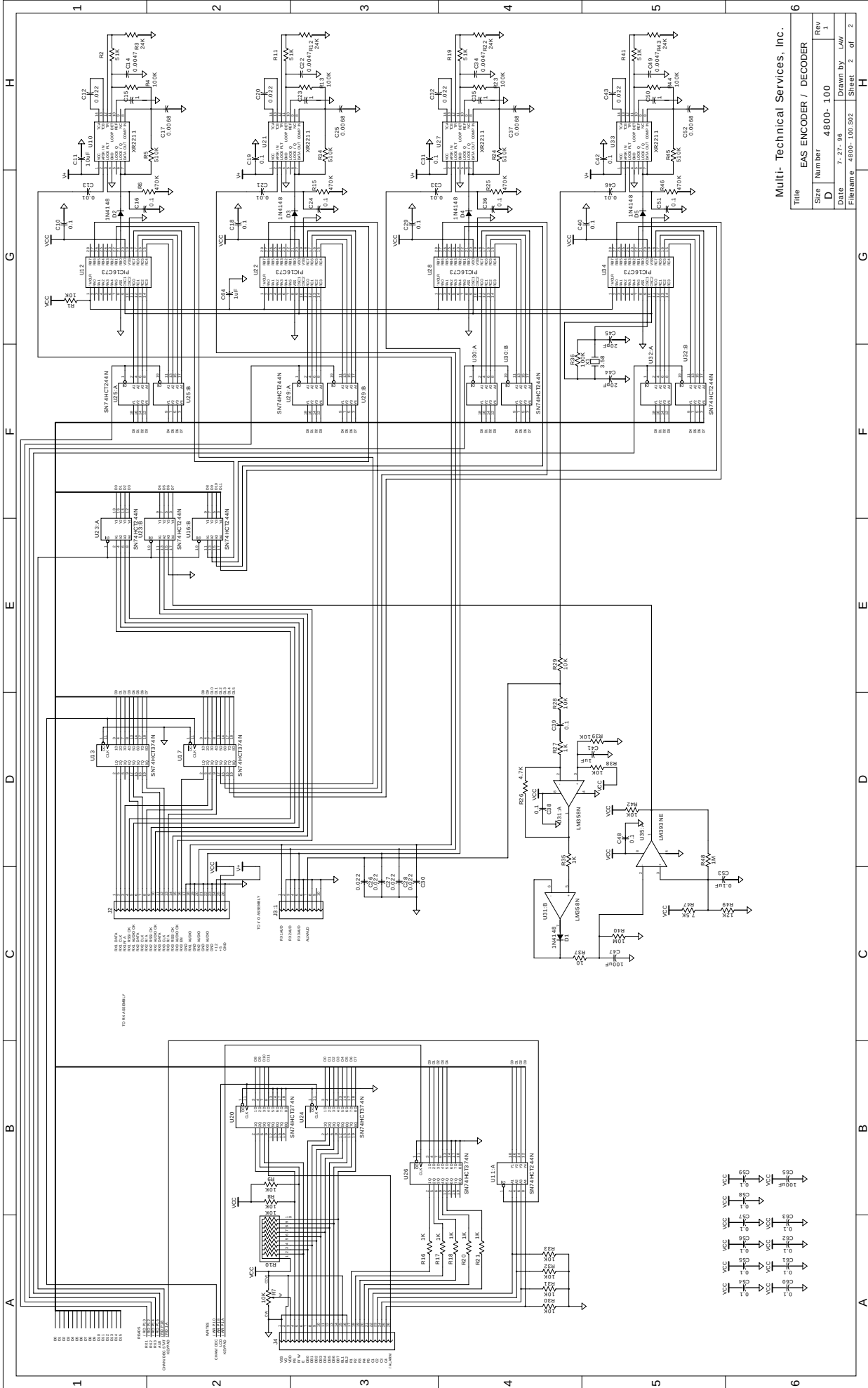
Data Switch

U25, 74HCT244 switch, is enabled by the /RD P10 from the read decoder. Eight bit parallel data from the micro-controller is routed to the ISA bus through U25 when enabled. Unless the DAV (Data Available) output from the micro-controller is true, U25 is not enabled.



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Address Decoder Section

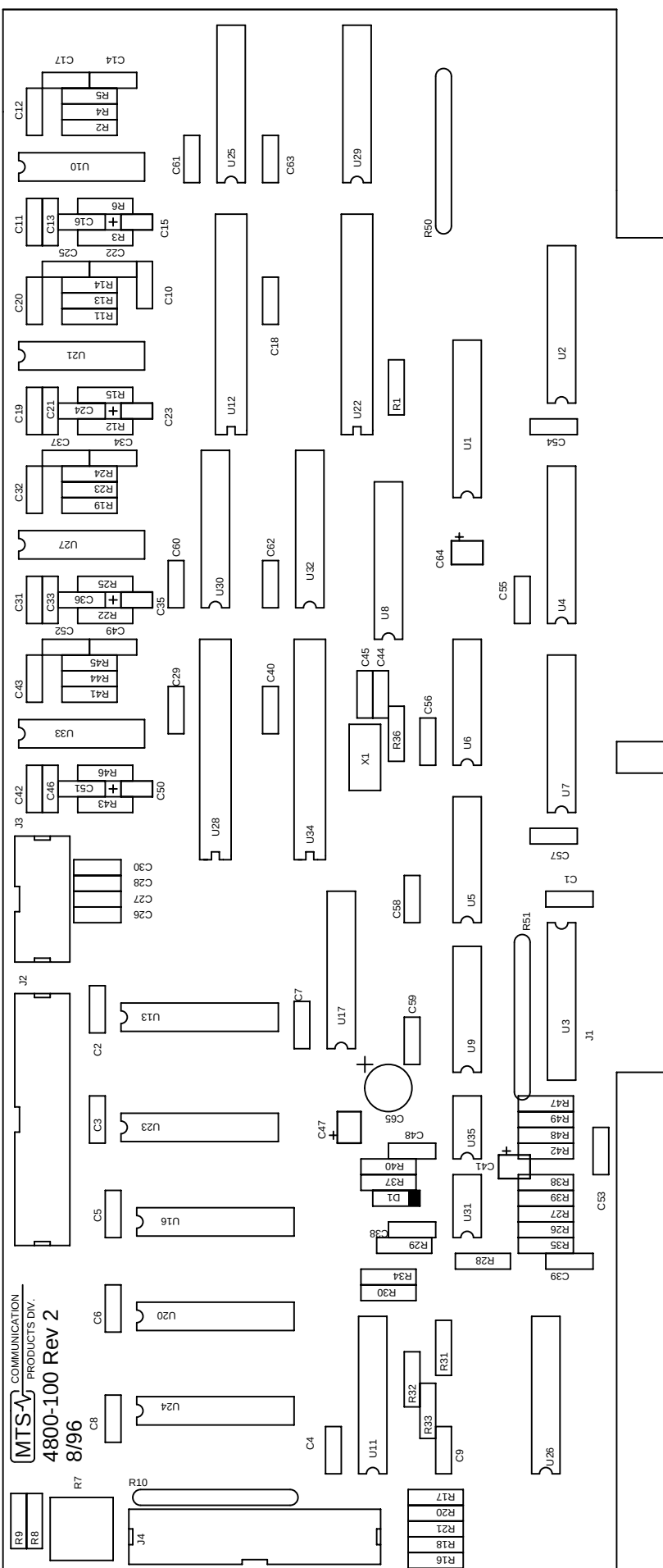
Title	Size	Number	4800- 100	Rev	2
Date	7- 27- 96	Drawn by	LAW	Sheet	1 of 1



Multi- Technical Services, Inc.

Title EAS ENCODER / DECODER			
Size	Number	4800- 100	Rev 1
D	Drawn by	LAW	
Date	7-27-86		
Filename	4800-100.S02	Sheet	2 of 2

MTS COMMUNICATION
PRODUCTS DIV.
4800-100 Rev 2
8/96



Section 5.5: I/O Assembly

I/O Assembly 4800-200

Overview

The I/O Assembly provides the following functions: ISA bus interface, 1050 Tone Detector, Cross Point Switch Matrix, Speaker Amplifier, Program Audio Loop Through, Relay Control, Digital Inputs, Digital Outputs, Line Drivers, and Auxiliary Inputs.

Specifications

Operating Temperature	0 to +50 degrees C
Operating Humidity	0 to 95% non-condensing
Supply Voltages	+5 Vdc @ 0.25 amps max +12 Vdc @ 0.3 amps max
Relay Contact Ratings	30 Vdc @ 60 mA max.
Line Drivers	-20 to +8 dBm (adjustable) 600 ohms 100 to 20,000 Hz
Speaker Driver	0 to 0.1 watts into 8 ohms (adjustable)
Auxiliary Inputs	1K ohms, 0 dBm Max
Digital Inputs	Opto-Coupled active low Sink Current 5 mA.
Digital Outputs	Opto-Coupled open collector outputs with diode protection. Maximum sink current: 5 mA.
1050 Tone Detector	+/- 0.5% Threshold -10 dBm

Discussion

ISA Bus Interface

The ISA Bus Interface consists of four basic sections: Address Buffer, Directional Data Buffer, Card Address Decoder, and Read/Write Decoder.

The Address Buffer consists of U1, U4, and U7, which are 74HCT245 directional octal

buffers.

This section is used to buffers address lines A0 through A19, Address Enable, /IOW, /IOR, and the ALE outputs from the PCS ISA slot.

The Directional Data Buffer section consists of U2 , which is 74HCT245 a directional octal buffer. Data lines D0 through D7 are buffered and directed either to the PC or to the card. The direction of the data is determined by the state of the buffered /IOR signal. The buffered data lines are terminated by resistor pack R59.

The Card Address Decoder, U8, 74F521, compares buffered address lines BA5 through BA9 on the Q inputs of the 8 bit comparator against a preset code on the P inputs. When the value of BA5 through BA9 is equal to the corresponding P inputs and /BAEN is low then the output of U8 is low. This signal is used to enable the R/W decoders, Direction Data Buffer, 16 bit I/O enable (through U9:B) of the PC.

The R/W decoder sections, U5 and U6, are 74HCT138 3 to 8 line decoders. U5, the Read Decoder is enabled by the Card Address decoder output being low and the /BIOR signal being low. The value of the data on the Y outputs is determined by the value of the BA4 signal. The state of BA1 through BA3 determine which output is active. U6, the Write Decoder, works the same way, but the second enable signal is the /BIOW signal.

1050 Tone Detector

The 1050 tone detector is driven by one of the cross point switch outputs, such that any input may be examined for a 1050 tone. The detector is formed by a crystal controlled band pass filter, amplifier, peak rectifier, and a DC comparator. Audio from the cross point switch is coupled to the band pass filter through C30 and R33. The band pass filter is part of the S3526B filter IC. The center frequency of the filter is determined by the oscillator frequency which is controlled by crystal X1. The division ration selected is 1376:1. C36 and 37 provide the crystal with the appropriate load capacitance. R35 limits the Q of the crystal. C31 filters the analog reference voltage for the chip. Band pass audio is AC coupled to the amplifier by C34. C35 provides high frequency roll off to prevent spurious responses. The amplifier, U17:A, has a gain of 24, which is set by R37 and R31. R40, R43, and C41 provide filtered analog reference for the amplifier. The output of the amplifier is rectified by D5 and averaged by C38 and R44. Charge current for C38 is limited by R38. The resulting DC voltage is compared against a threshold set by R20 and R24 by comparator U14:A. The threshold voltage is filtered by C25, and hysteresis is provided by R28. R18 is the pull up resistor for the open collector output of the comparator. The comparator output is low when the 1050 Hz level exceeds -10 dBm. The /1050 signal is switched to the data bus through U3, 74HCT244 switch, which is enabled by /RD P12 from the read decoder.

Cross Point Switch Matrix

The cross point switch matrix is based on a MT8816AE , U13, a programmable 16 x 8 switch matrix. The switch address data for U13 is latched from the data bus by U12, 74HCT374, which is enabled by /WR P16. The control data for U13 is latched from the data bus by U11, 74HCT374, which is enabled by /WR P10. The audio inputs to the switch matrix are:

- Channel 1 Audio
- Channel 2 Audio
- Channel 3 Audio
- Channel 4 Audio
- Sound Card Audio Out
- Line In
- Auxiliary In
- 1050 Tone

The audio outputs from the switch matrix are:

- Speaker Amplifier
- Left Loop Line Driver
- Right Loop Line Driver
- Line Driver A
- Line Driver B
- Sound Card Audio In
- 1050 Tone Detector

The switch can be programmed to route any input to any output and is under software control.

All switch I/O is biased to $\frac{1}{2}$ Vcc by resistor packs R5, R6, R7, R21, R22, R23. Vcc to the device is filtered by R19, C24, and C23.

Speaker Amplifier

The speaker amplifier is based on a LM386, U20, which has a gain of 20. Audio is AC coupled to the amplifier from the cross point through C43. Pot R49 is the volume control. V+ is filtered by R46 and C42. C42 and R50 provide high frequency termination which prevents oscillation. Audio output is coupled through C44 to the front panel speaker jack, J5.

Program Audio Loop Through

Provisions for a balance stereo program audio loop through have been made on this assembly. Note that this capability *is required by Part 11 of the FCC Rules, and exists in the standard MTS product at no extra charge.*

The program loop through relays are K1 and K2. Each relay driver for K1 through K6 are identical. The K1 driver is an NPN transistor, Q1. D1 prevents inductive ringing across the coil of K1, and D3 protects Q1 from any ringing. R25 limits the base current supplied to Q1 from the data latch, U24. The loop line drivers are described in the line driver section of this document.

Relay Control

Relays K1 through K6 have identical drivers as described above. Latched data from the data bus is through U24, 74HCT374, which is enabled by /WR P14 from the write decoder. Relays K3 through K6 are dual form C relays with all contacts available at the rear panel. Each relay is user programmable from the setup menu, and may be used for additional loop through applications.

Line Drivers

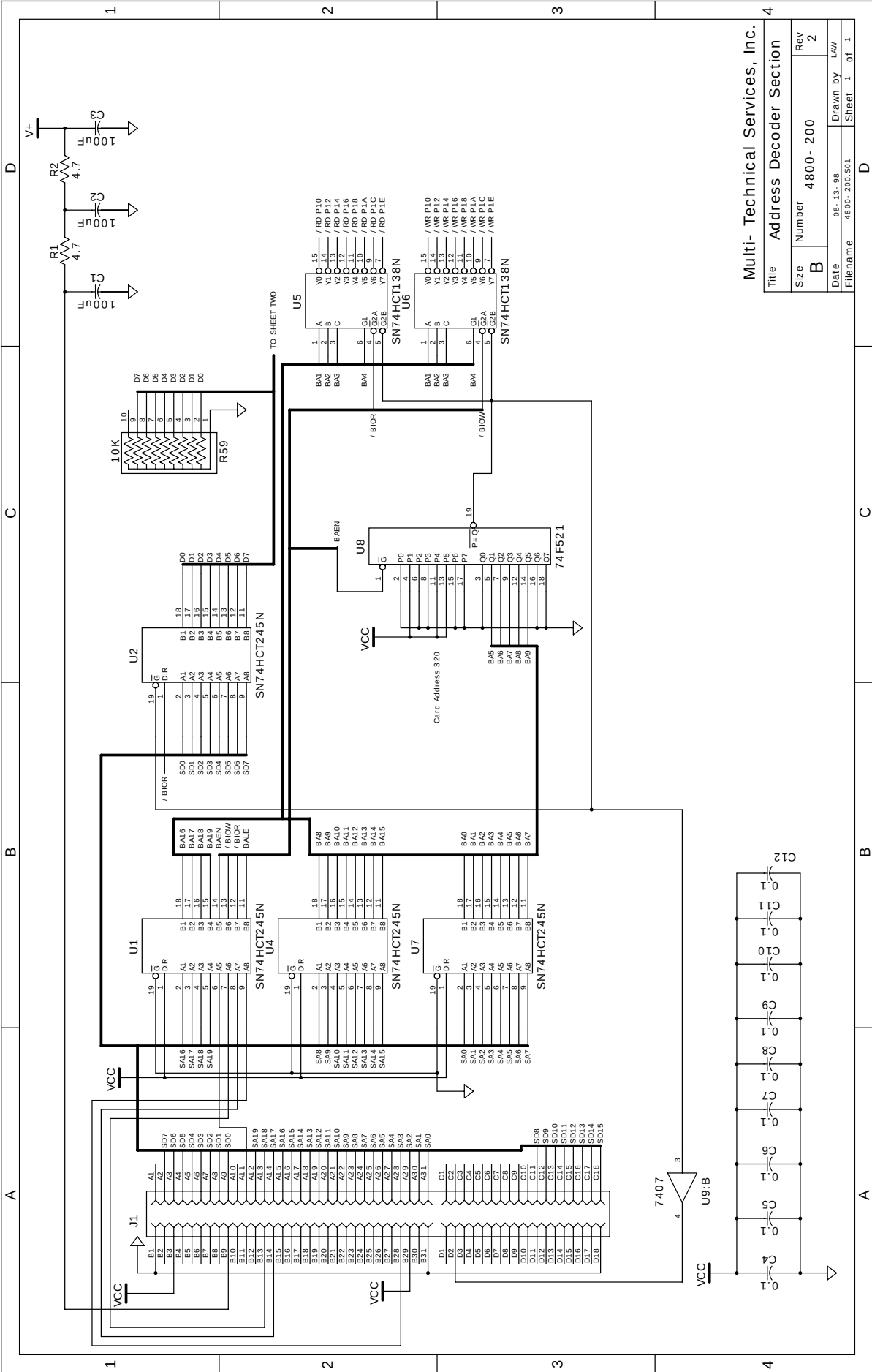
This assembly houses four 600 ohm high level line driver stages. The first two are applied to the program audio loop through relays, K1 and K2. The other two are available at the rear panel. Each line driver is identical. In the first line driver, audio is AC coupled from the cross point switch by C14 to the amplifier. The stage gain is adjustable from -20 to +8 dBm by pot R3. Filtered analog reference for the amplifier is obtained from R10, R11, and C17. R9 limits current through the primary of audio transformer T1 and C15 provides the DC block.

Auxiliary and Line Inputs

Both the auxiliary and line inputs are directly coupled to 1k pots and are identical. For the auxiliary input, pot R52 adjusts the input level to the cross point switch. R51 prevents loading and C46 provides the DC block.

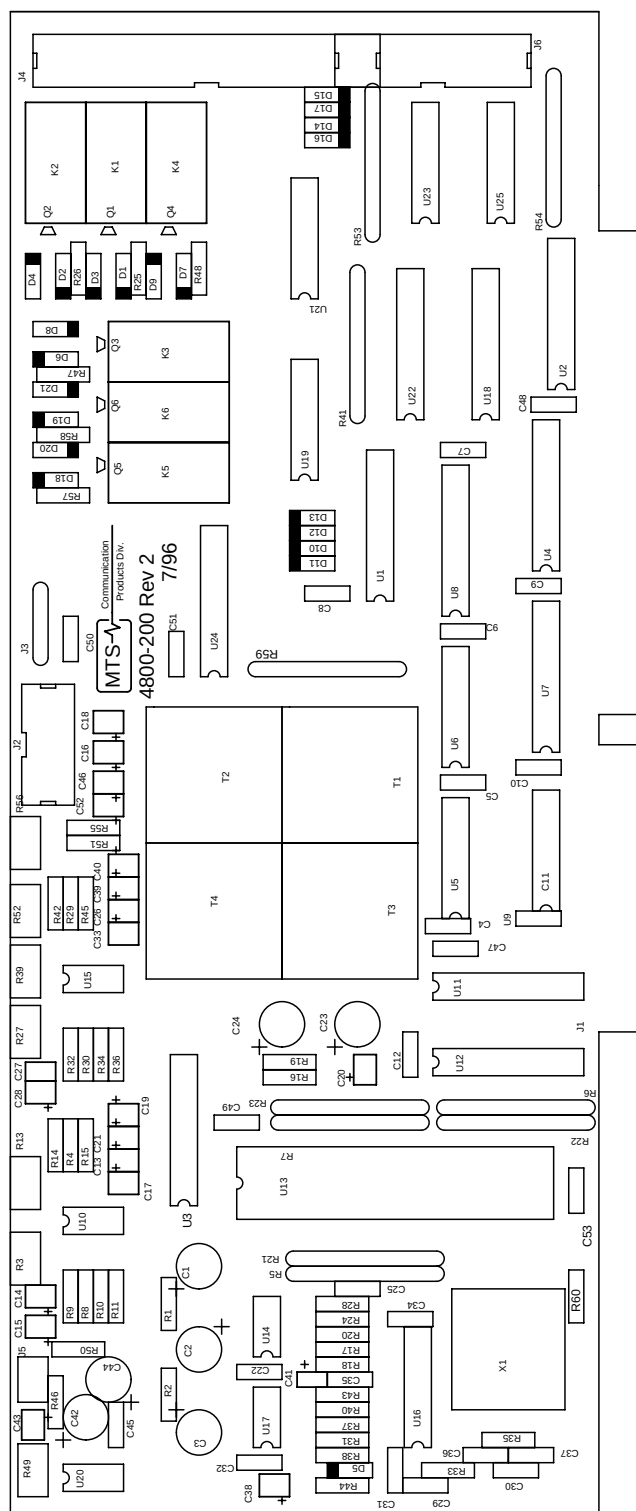
Digital I/O

This assembly houses 8 digital opto-coupled inputs and 8 digital opto-coupled outputs. The inputs, U23 and U25, are pulled up to +5 volts through the LED and R54. To make the input active, pull the input to ground, which will require sinking 5 mA and can be accomplished by any number of means including a simple push button switch. These I/O lines are opto-coupled to give reliable performance in high level RF fields and other electrically noisy areas. Each I/O line is user programmable as to its function. The input data is routed through switch U22 which is enabled by /RD P10 from the read decoder. Output data is latched to opto-couplers U19 and U21 by U18 which is enabled by /WR P12 from the write decoder. The outputs of the opto-couplers is protected from ringing by diodes D10 through D17. No pull up voltage source is provided in the unit. We recommend that the external source supply less than 15 Vdc at 5 mA or less.



Multi-Technical Services, Inc.
Address Decoder Section

Title		Rev	
Size	B	Number	4800-200
Date	08-13-98	Drawn by	LAW
Filename	4800-200.S01	Sheet	1 of 1



Section 5.6: Receiver Mother Board

Receiver Mother Board Assembly 4800-600

Overview

The receiver mother board assembly provides four basic functions:

- (1) Dedicated level adjustable line driver for each of the three sources.
- (2) Audio level detector for each of the three sources.
- (3) Audio inputs for each three sources.
- (4) Audio switching between external sources and internal receivers.

Specifications

Operating Temperature	0 to +50 degrees C
Operating Humidity	0 to 95% non-condensing
Supply Voltage	12 Vdc +/- 0.2 Vdc
Supply Current	120 mA max
External Audio Inputs	
Impedance	1k ohm
Level	0 dBm
Input Type	AC coupled, Single Ended
Line Level Outputs	
Type	Active Balanced AC coupled
Nominal Load	600 ohms
Level	-20 to +8 dBm
Level Detector Threshold	-2 dBm

Discussion

The four basic circuits on this assembly are triplicated. We will describe 1 section of each circuit in this text.

Line Driver

The input to the first line driver is the level control, R36. C14 provides AC coupling to the following operational amplifier, U5:B. U5:5 has voltage gain set to ten by the ratio of R31 (100K) to R32 (10K). C12 provides compensation for the gain curve above 20

kHz. The output of U5:B drives one side of the balanced load through R33 (100 ohm) which is for ring dampening, and U5:A. U5:A is an inverting amplifier with unity gain and drives the opposite side of the balanced load. R42 (100 ohm) is the ring dampening element for U5:A. C17 and C22 provide high frequency termination to both sides of the load. C13 and C21 provide DC isolation for both sides of the load.

Audio Level Detector

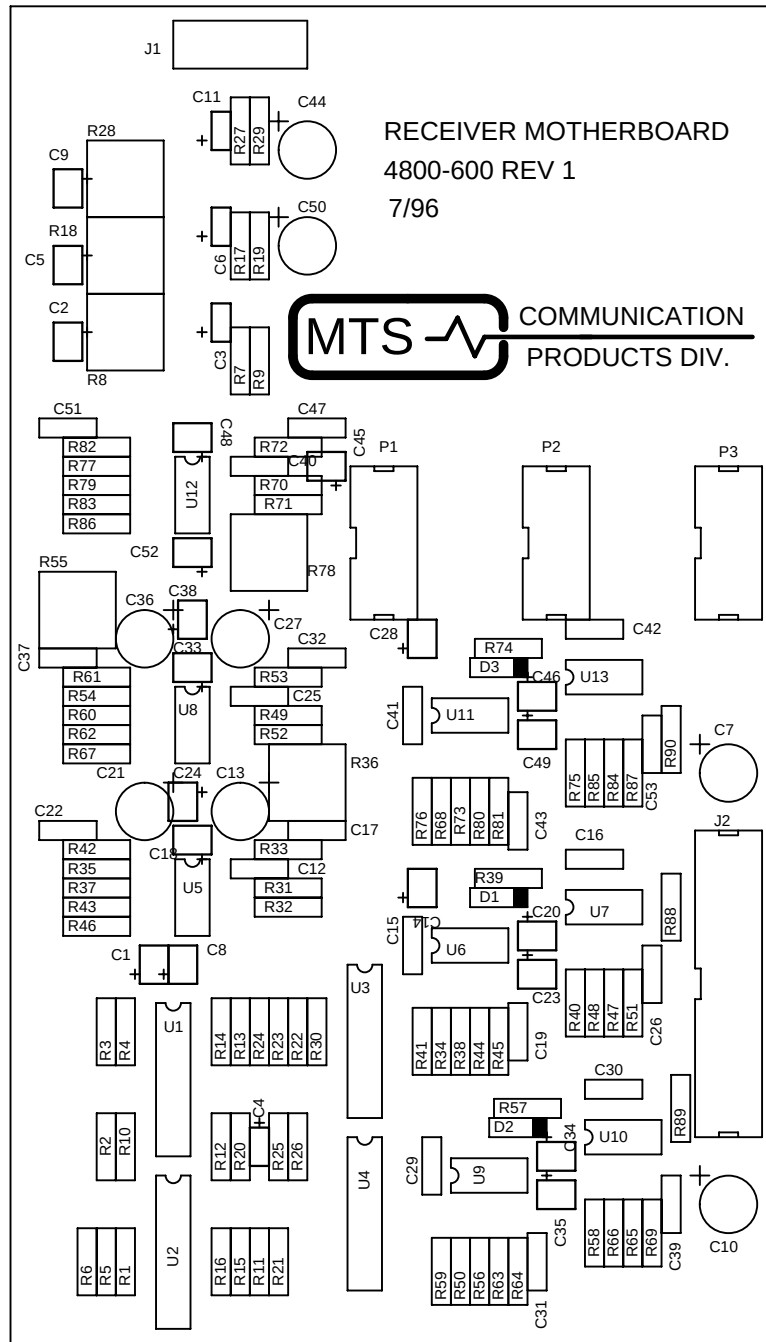
The first stage of the audio level detector is an op-amp with a gain set just above unity. C19 provides DC blocking. The gain is set by R34 and R32. R44, R45, and C23, provide the filtered analog reference for the op-amp. R41 is the coupling resistor peak rectifier stage that follows the op-amp. R10, C20, and R88 form an averaging filter that averages the resulting DC from the peak rectifier. This averaged voltage is then compared against a threshold that is set by R47 and R51 at comparator U7. C26 filters the threshold voltage. R40 is a pull-up resistor for the open collector output of the comparator. The comparator output is low for about ten seconds after the audio level in exceeds -2 dBm.

Audio Inputs

If the user has selected *audio* instead of one of the receiver modules for an eas source, the System 3000D enables one of the audio inputs and disables the receiver for that channel. The Channel 1 audio input is AC coupled, single ended, with an input impedance of about 1K ohm. The AC coupling cap is C2, and provisions for reducing the level of the external audio is made at R8.

Audio Switching

Two solid state bi-lateral switches are used to select *audio or receiver* inputs for each channel. In the first channel, U1-B is the audio source switch and U1-A is the receiver switch. Each I/O pin for each switch is biased to $\frac{1}{2} V_{cc}$ by a simple divider network such as is shown by R7 and R9 on the input to U1-B. The state of the two switches is determined by the RX(Channel) R/A input. If the R/A input is low then U2:A output is Hi, enabling U1:A and causing receiver audio to be routed to the RX1 Audio Pin. During this same condition of R/A being low, U2:C and U2:B buffer the R/A input which disables U1:B and keeps the external audio path off. When R/A is Hi, The receiver path is off and the external path is on. Note that the audio level detector section and the dedicated line driver as well as the RX1 audio pin are driven by the bilateral switch that is enabled.



Section 5.7: NOAA Receiver

VHF High Band FM Receiver Module 4800-300

Overview

The VHF Hi Band FM receiver module is designed to cover the NOAA Weather Radio frequencies, 162.400 to 162.575 MHz, in 25 KHz steps. This receiver is a dual conversion super heterodyne type with a 10.7 MHz IF and a 455 KHz IF and uses low side LO injection.

Specifications

Supply Voltage	12 Volts DC +/- 0.2 V
Supply Current	50 mA max.
Operating Temperature	0 to +50 degrees C
Operating Humidity	0 to 95% non-condensating
Sensitivity	0.5uV 10 dB S+N/N
Third Order Intercept	-22 dBm
Noise Figure	6 dB
Maximum RF input	+20 dBm
AM Rejection	34 dB
Input Impedance	50 ohms
Ultimate S/N	67 dB

Discussion

RF Input

The receiver module has a common base bi-polar RF front end. C14 is the input coupling capacitor. L2 and R18 provide broadband emitter termination. R11, R12, and C18 provide bias for the base of Q1. The collector of Q1 is tuned by L1 and C6. C5 and R4 provide decoupling from the 5 volt supply. C9 couples energy from the tuned collector of Q1 to the first mixer input of the receiver IC, U5.

IF Filters

The output of the mixer is filtered by the first IF filter, FL2, a 10.7 MHz ceramic filter. The output of the first filter directly drives the second mixer. The second mixer output is filtered at FL2, a 455 kHz narrow band filter (6 kHz) which directly drives the limiter input of U5.

Detector

The detector is a quadrature type, at 455 kHz. L4 contains a parallel C that resonates at 455 kHz for the tuning.

10.245 Local Oscillator

The second local oscillator is controlled by X1, a 10.245 MHZ crystal. C16 and C11 provide the load C for the crystal.

RSSI Output

U5 has an on-chip RSSI comparator. The threshold is adjustable at R13. The RSSI OK output is low when the RF input level is above the threshold. R15 is the pullup for the open collector output of the comparator.

Audio Output

Audio from the receiver IC is filtered by R17 and C32 then coupled to the audio amplifier, U7, by C39. U7 has adjustable gain, from 0 to 20 by means of potentiometer R20.

Synthesizer

The local oscillator output from the receiver IC, U5 pin 20, is terminated with a 3K resistor and drives the prescaler, U6, input through coupling capacitor C36. The prescaler is a divide by 64/65. The divided output from the prescaler is coupled to the divide by N input of the synthesizer IC, U2, through coupling capacitor C31.

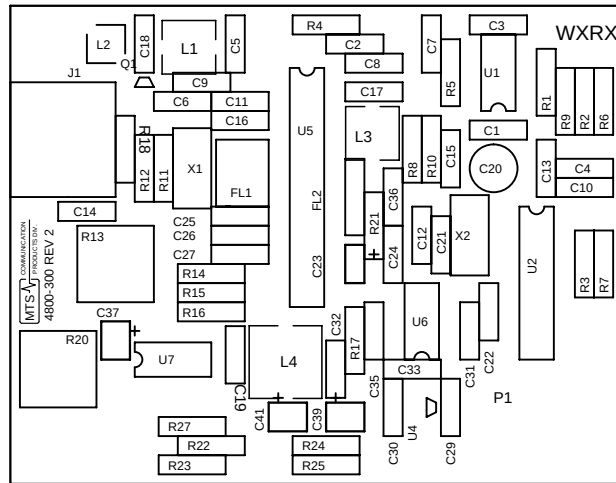
U2 is a single chip synthesizer that contains the programmable divide by N, phase detector, error amplifier and the serial interface. The 10 MHZ reference oscillator is controlled by X2. C12, C21, and C20 provide the appropriate load capacitance, with C20 being the trimmer. The phase detector outputs are filtered by R3/C4, and R7/C10. The loop filter is an active differential type based on an LM308 op-amp, U1. The output of the active filter drives a single section R/C filter consisting of R5, and C7. The resulting DC tuning voltage is applied to the on-chip varactor at pin 23 of the receiver IC, U5. The remaining components of the local oscillator are L3 and C17, the form the oscillator tank circuit.

Antenna Connection

J1 is the antenna connector. The input impedance is approximately 50 ohms.

Voltage Regulator

U4 provides a regulated +5 Vdc supply for the receiver. C29 and C30 provide decoupling for the input and output of the regulator.



Component Locator

Section 5.8: FM Receiver

FM Receiver Module 4800-400

Overview

The FM receiver module is designed to cover the FM broadcast band, 88-108 MHz, in 200 kHz steps. This receiver is a single conversion super heterodyne type with a 10.7 MHz IF and uses high side LO injection.

Specifications

Supply Voltage	12 Volts DC +/- 0.2 V
Supply Current	50 mA max.
Operating Temperature	0 to +50 degrees C
Operating Humidity	0 to 95% non-condensating
Sensitivity	1uV 10 dB S+N/N
Third Order Intercept	-10 dBm
Noise Figure	5.2 dB
Maximum RF input	+20 dBm
AM Rejection	34 dB
THD	-42 dB
Input Impedance	50 ohms
Ultimate S/N	73 dB

Discussion

RF Input

The receiver module has a common base bi-polar RF front end. C8 is the input coupling capacitor. L2 and R13 provide broadband emitter termination. R14, R15, and C14 provide bias for the base of Q1. The collector of Q1 is tuned by L1 and D1. C13 provides a DC block for varactor D1. C7 and R7 provide decoupling from the 5 volt supply. C9 couples energy from the tuned collector of Q1 to the following tuned circuit consisting of D2 and L4. C19 provides a DC block for varactor D2. Coupling to the RF input of the receiver IC, U4 is directly across L4. The RF input of U4 is gilbert cell mixer.

IF Filter

The output of the mixer is filtered by the first IF filter, FL1. This ceramic filter has a bandwidth of +/- 180 kHz. The output of the first filter drives the IF amplifier of U4. The second IF filter, FL2, is between the IF amplifier and the limiter of U4. The overall gain

of the IF section is 90 dB.

Detector

The detector is a gilbert cell quadrature. One port of the gilbert cell is driven by the IF limiter and the other port is AC coupled to the tuned quadrature network consisting of L3 and C18.

Local Oscillator

The local oscillator is a colpitts L/C type, with L5 being the tuning inductance and D3 / C30 being the tuning capacitance. C30 provides a constant 10.7 MHZ offset from the tuned RF frequency. C27 and C28 provide DC isolation for L5 and D3. C25 couples the oscillator output to the input of the prescaler section of the synthesizer.

RSSI Comparator

U4 has a RSSI output which is a voltage that is directly proportional to the RF input. This voltage is compared against a threshold set by R17 and R20 by comparator U3. If the RSSI output from U4 exceeds the threshold the comparator output is low.

Audio Output

Audio from the receiver IC is filtered by R21 and C23 then coupled to the audio amplifier, U2, by C4. U2 has adjustable gain, from 0 to 20 by means of potentiometer R1.

Synthesizer

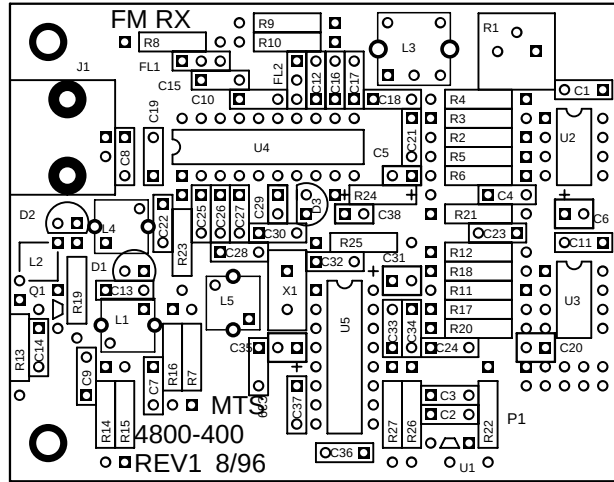
U5 is a single chip synthesizer that contains the prescaler, programmable divide by N, phase detector, error amplifier and the I2C bus interface. The 4 MHZ reference oscillator is controlled by X1. The loop filter consists of C33, C34, R26, R27, and C36.

Antenna Connection

J1 is the antenna connector. The input impedance is approximately 50 ohms, but will work great with 75 ohm antennas, too.

Voltage Regulator

U1 provides a regulated +5 Vdc supply for U3, U4, and U5. C2 and C3 provide decoupling for the input and output of the



Component Locator

Section 5.9 AM Receiver

AM Receiver Module 4800-500

Overview

The AM receiver module is designed to cover the AM broadcast band, 530 to 1790 kHz, in 10 kHz steps. This receiver is a single conversion super heterodyne type with a 455 kHz IF and uses high side LO injection.

Specifications

Supply Voltage	12 Volts DC +/- 0.2 V
Supply Current	50 mA max.
Operating Temperature	0 to +50 degrees C
Operating Humidity	0 to 95% non-condensating
Sensitivity	5uV 10 dB S+N/N
AGC Range	91 dB
AGC Threshold	30uV
Maximum RF input	+20 dBm
Input Impedance	100 ohms
Ultimate S/N	55 dB
IF Suppression	40 dB
THD	1% for 500mV m=30%
Ripple Rejection	38 dB
Audio Bandwidth	6 kHz

Discussion

RF Input

The receiver module has a double tuned front end. C2 is the antenna coupling capacitor. L1 and D2 make the first tuned stage, and is tuned by the synthesizer tuning voltage, thru R2. C5 provides DC blocking. C2 couples from the first tuned stage to the second filter, L2 and D3. D3 is tuned by the synthesizer tuning voltage thru R3. C4 provides coupling to the RF input of the receiver IC U3. The gain controlled RF amplifier is on board the receiver IC and drives a double balanced mixer.

IF Filter

The output of the double balanced mixer drives the IF coupling transformer, T1. The primary of T1 is tuned to 455 kHz by C25. The secondary of T1 drive the ceramic 455 kHz filter, which has a bandwidth of 6 kHz.

IF Amplifier, Detector, and AGC Amplifier

Each of these stages are on-board the receiver IC. The IF amplifier gain is directly controlled by the AGC amplifier. The detector is a balanced full-wave type. C21 provides decoupling for the detector. AGC level and time constants are determined by C22 and C23.

Local Oscillator

The oscillator is a differential amplifier type. L3 and the combination of C9 and D1 form the tank. C9 provides a constant 455 kHz offset from the tuned RF frequency. D1 is tuned by the synthesizer tuning voltage thru R4.

RSSI Comparator

The TDA1072 receiver IC has an RSSI output voltage that is directly proportional to the RF input level. The RSSI output voltage is compared against a threshold set by R16 and R21. If the RSSI is greater than the threshold then the comparator, U4, output is low. R14 is a pull up for the open collector output of the comparator.

Audio Output

Audio out from the TDA1072 is filtered by C21, R20, and C28. C29 couples to the audio amplifier IC, U5. U5's gain is adjustable from 0 to 20 at R19. C30 provides DC blocking on the output.

Synthesizer

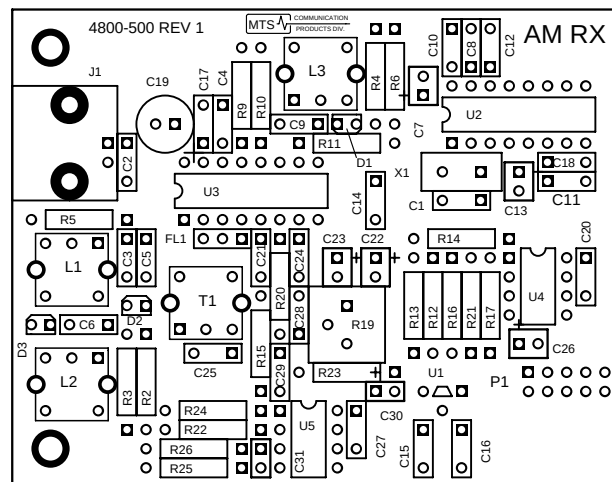
The local oscillator is controlled by a single chip synthesizer, U2. U2 contains the prescaler, programmable divide by n, phase detector, error amplifier, and the I2C bus interface. The reference oscillator is controlled by X1, the 4 MHz crystal. C10, C12, R6 and C8 form the loop filter. The synthesizer is programmed thru the I2C bus, which is a two line bi-directional data bus.

Antenna Connection

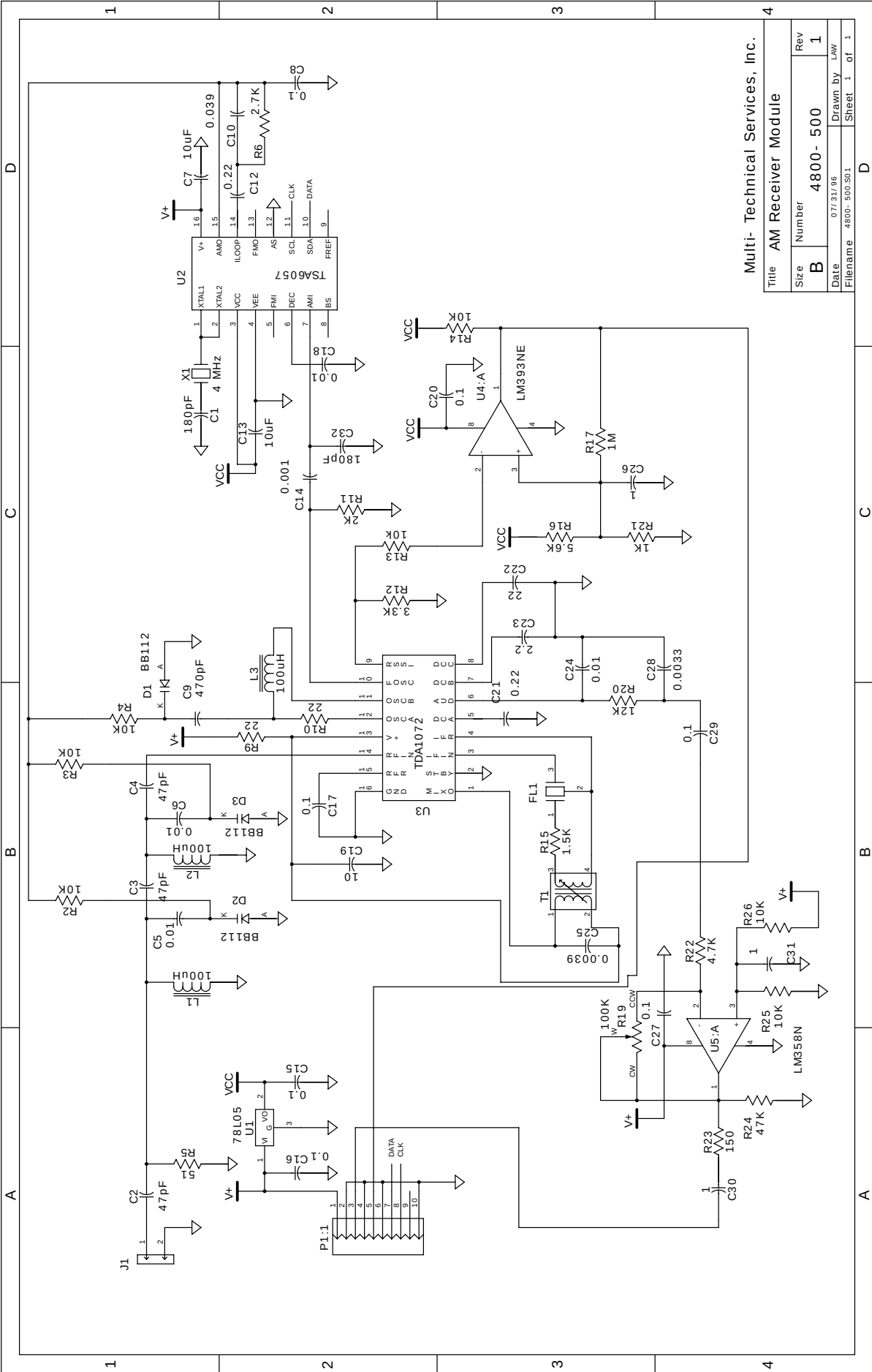
J1 is the antenna connection. The input impedance is low, on the order of 100 ohms. For best results use a tuned loop type antenna. A number of tuned loop type antennas are available from such companies as: Palomar Engineering, Belar, Ramsey Electronics, and others. MTS has two different loop antennas in development (active loop and passive loop), but are not available at this writing.

Voltage Regulator

Regulated +5 volts is supplied by U1. Capacitors C15 and C16 provide RF decoupling and filtering to the input and output of U1. The regulated +5 supplies the logic portion of the synthesizer and the RSSI comparator.



Component Locator



Multi- Technical Services, Inc.

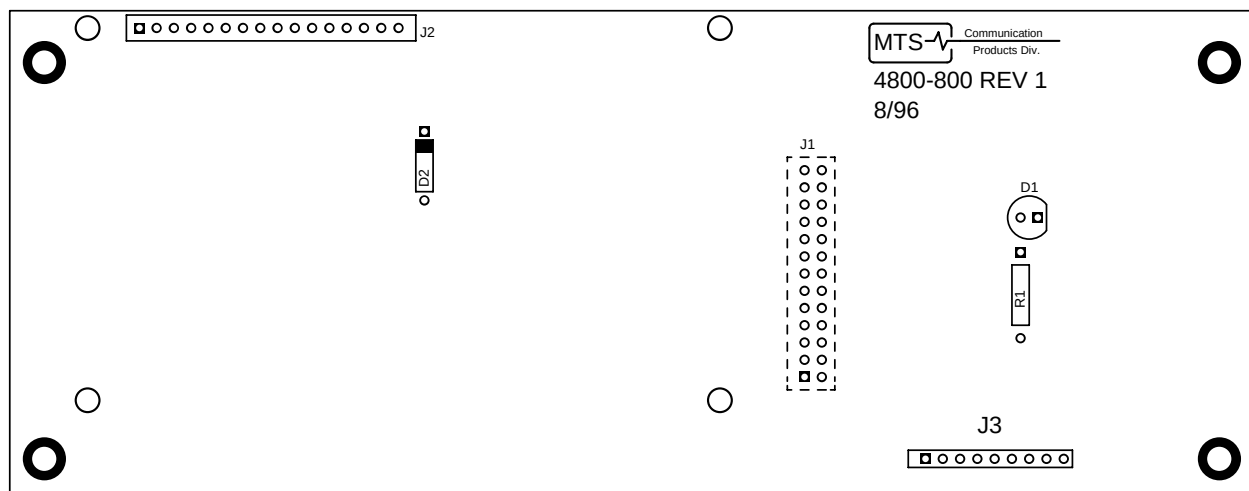
Title AM Receiver Module			
Size B	Number 4800- 500	Rev 1	
Date 07/31/96	Drawn by LAW	Sheet 1	of 1
Filename 4800- 500.501			

Section 5.11: Display Assembly

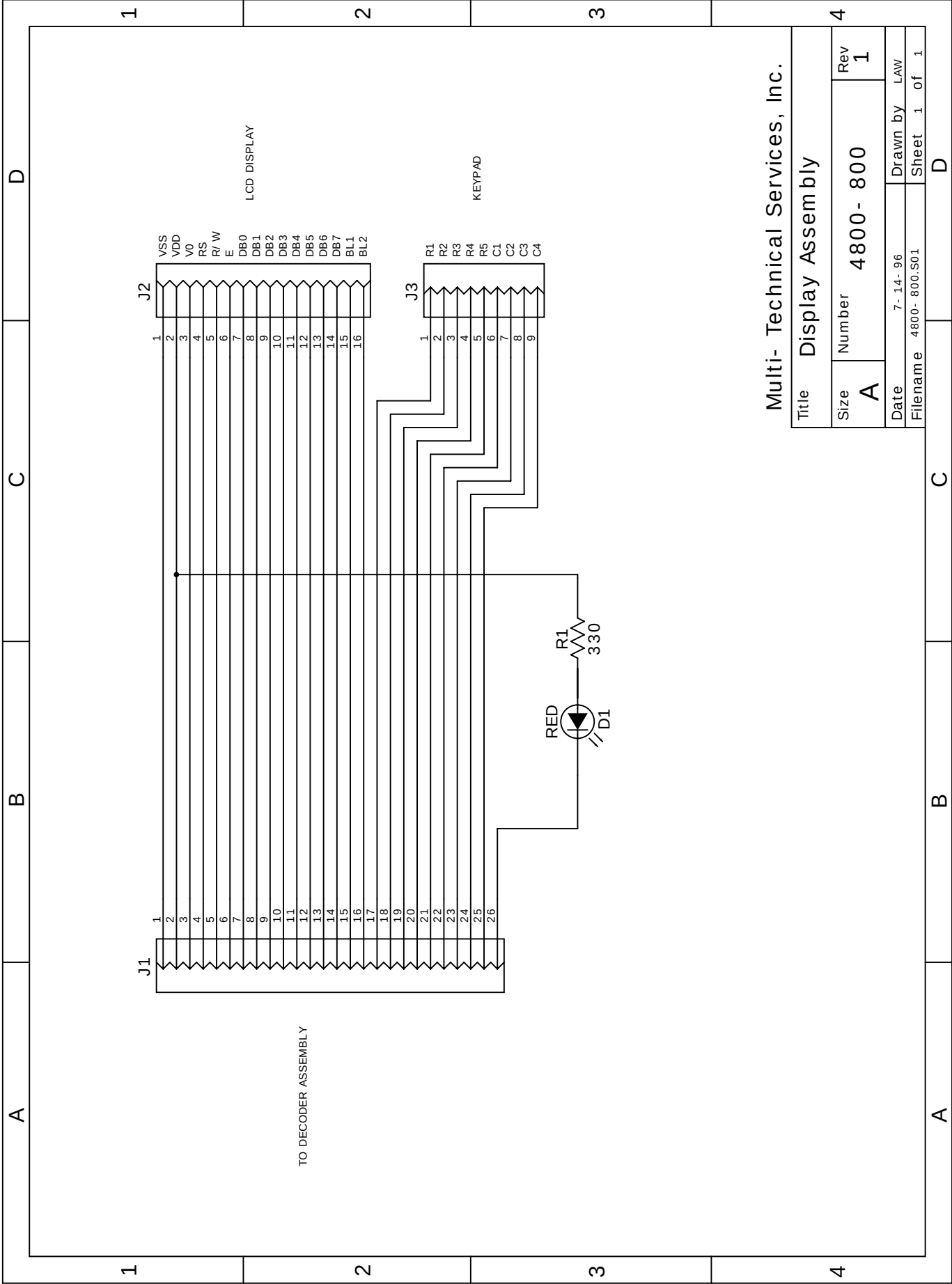
Front Panel Board Assembly 4800-800

Overview

The Front Panel Board Assembly provides a single connector interface to the LCD Display, Keypad, and Alarm LED.



COMPONENT LOCATOR

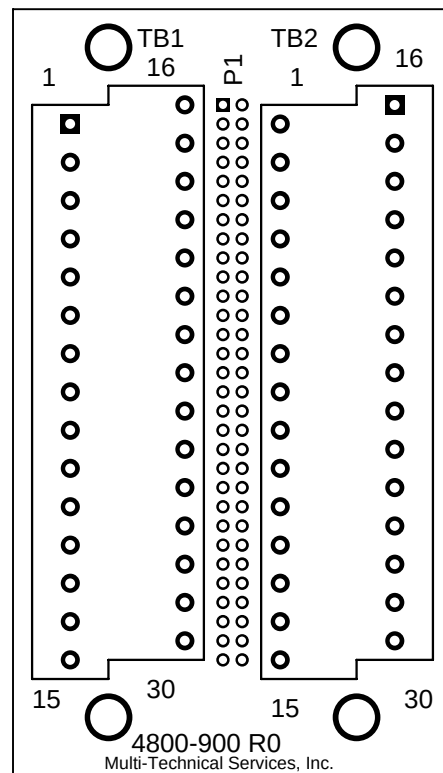


Section 5.12: Terminal Board 1

Terminal Board Assembly 4800-900

Overview

The terminal board assembly serves to convert the high density connector on the I/O Assembly to a convenient detachable terminal block style of connector.



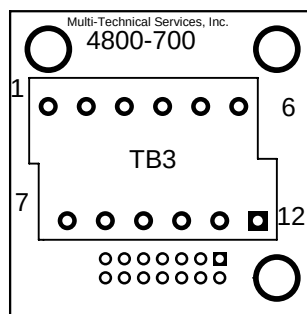
COMPONENT LOCATOR

Section 5.13: Terminal Board 2

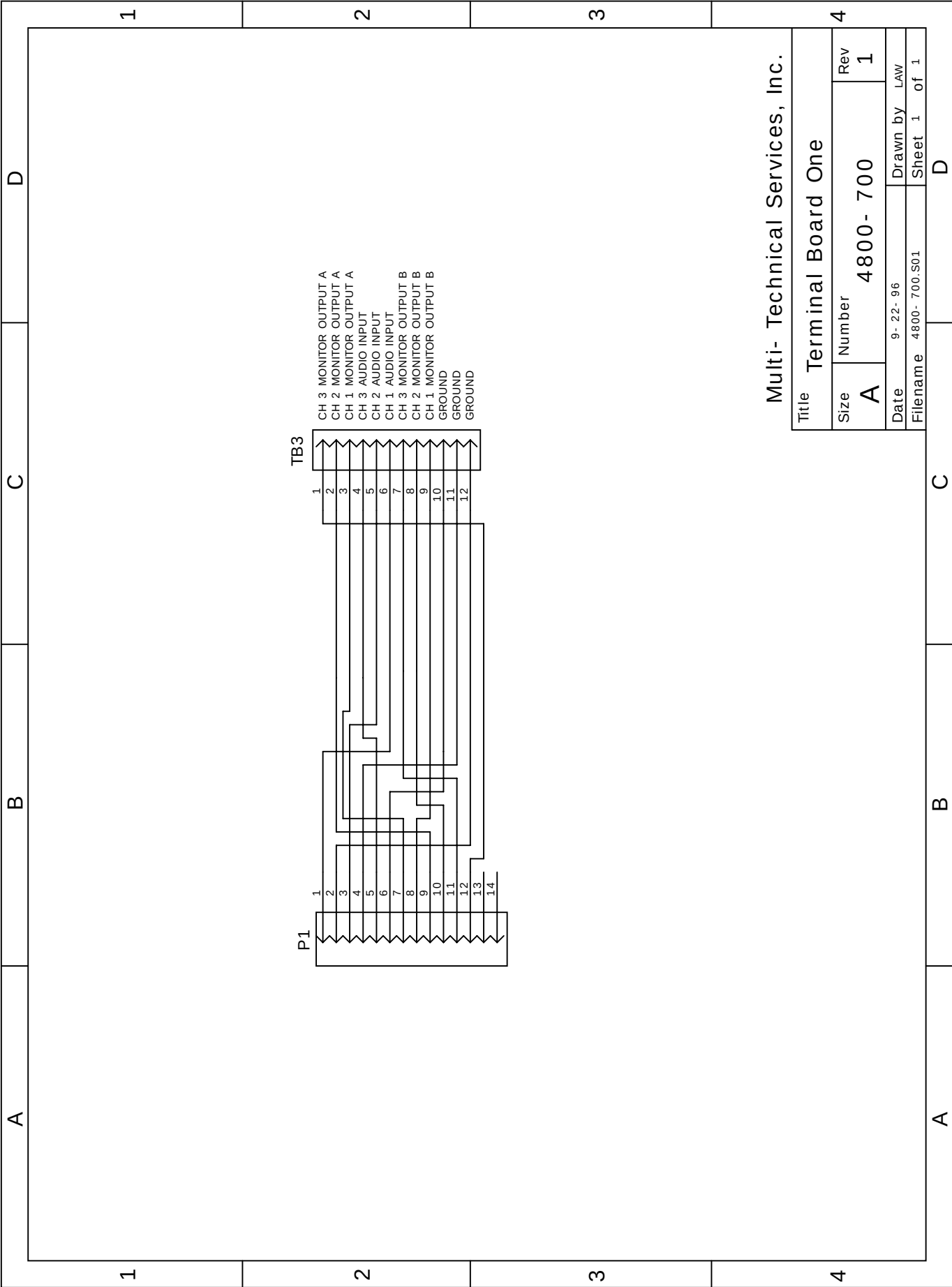
Terminal Board Assembly 4800-700

Overview

The terminal board assembly serves to convert the high density connector on the RX Mother Board Assembly to a convenient detachable terminal block style of connector.



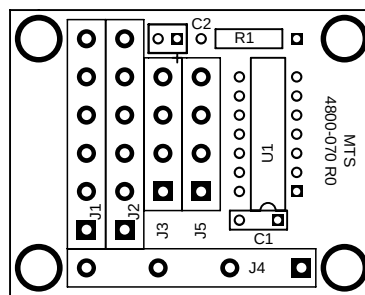
COMPONENT
LOCATOR



Section 5.14: Wiring and Interconnect

Power Distribution Assembly 4800-070

The power distribution assembly converts the terminal block output of the power supply to a printed circuit / wiring distribution system. The power distribution assembly also houses the power good pulse generator for the processor board that keeps the processor from starting until the supply is well into regulation.

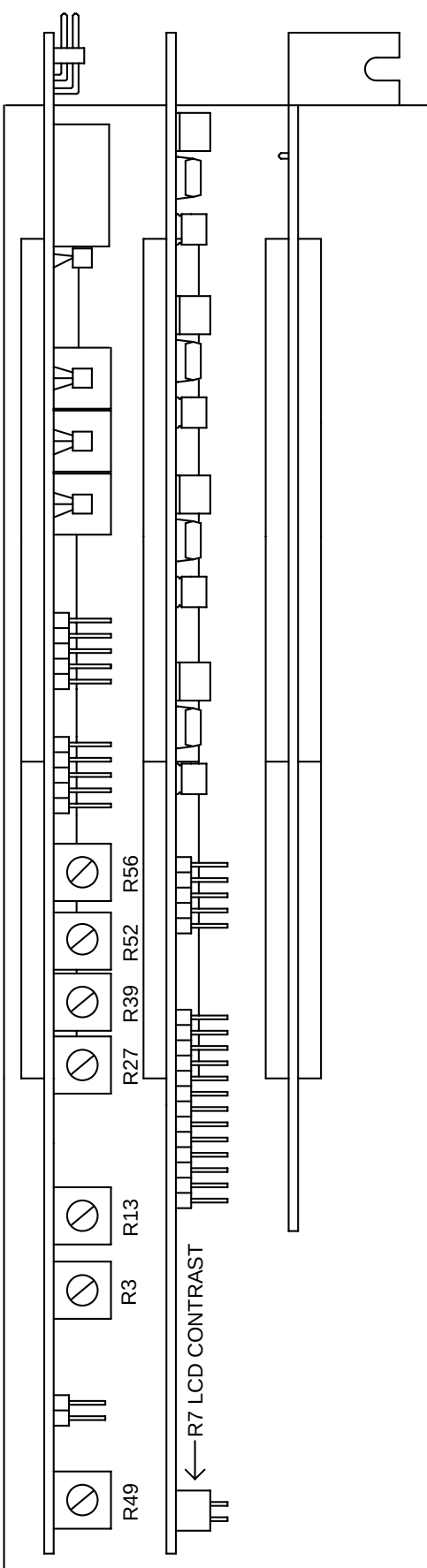


Component Locator

Section 5.15: Adjustments

The following adjustments are available to the user:

Description	Range	Preset	R	Assembly
Loop Audio Left Level	-20 to +8 dBm	+4 dBm	R3	4800-200
Loop Audio Right Level	-20 to +8 dBm	+4 dBm	R13	4800-200
Audio A Level	-20 to +8 dBm	+4 dBm	R27	4800-200
Audio B Level	-20 to +8 dBm	+4 dBm	R30	4800-200
Speaker Volume	0 to 0.1 watts	30 mW	R49	4800-200
EAS Audio Input Level	0 to +8 dBm	0 dBm	R52	4800-200
Line Input Level	0 to +8 dBm	0 dBm	R56	4800-200
Aux 1 Input Level	0 to +8 dBm	0 dBm	R8	4800-600
Aux 2 Input Level	0 to +8 dBm	0 dBm	R18	4800-600
Aux 3 Input Level	0 to +8 dBm	0 dBm	R28	4800-600
Monitor 1 output level	-20 to +8 dBm	+4 dBm	R36	4800-600
Monitor 2 output level	-20 to +8 dBm	+4 dBm	R55	4800-600
Monitor 3 output level	-20 to +8 dBm	+4 dBm	R78	4800-600



Multi-Technical Services, Inc.			
Part Number	4800- 093A	Rev 1	150 Clayton Commerce Center Clayton, NC 27520 919-553-2995
Part Description :		Adjustment Locator	
Class of Item:	Instruction	System 3000D	EAS
Material:	N/A	Finish:	N/A
Tolerance:	+/- 0.010 Inch		Approved:
Drawn By:	Ed Karwacki		Date: 9/24/96

Section 6: Maintenance

The System 3000D has been designed to provides years of trouble free service and requires no periodic hardware maintenance.

Troubleshooting Chart

Symptom	Probable Assembly
Unit does nothing, no display	Power Supply
Keypad does not work	Decoder Assembly
Display does not work	Decoder Assembly Display Assembly
No Receiver 1 Audio, RSSI not OK	Antenna Bad Receiver 1 Module
No Receiver 2 Audio, RSSI not OK	Antenna Bad Receiver 2 Module
No Receiver 3 Audio, RSSI not OK	Antenna Bad Receiver 3 Module
Will not decode EAS	Decoder Assembly
Will not encode EAS or two tone	Sound Card
Will not record or play messages	Sound Card
Receiver channel works, but no monitor output at the rear panel	Receiver Mother Board
Digital I/O lines do not work	I/O Assembly
Relays do not operate	I/O Assembly

Section 7: Technical Assistance

Technical assistance is available by calling Customer Service at (919) 553-2995 during business hours 8 am to 5 pm Eastern Monday thru Friday. Written requests may be faxed to (919) 553-0437 any time, or E-mailed to LYN@MTS-COMM.COM. E-mail can be sent from our website at WWW.MTS-COMM.COM.

Section 8: Factory Service Procedure

If factory service is required for your System 3000D, contact customer service at (919) 553-2995 and obtain a Return Material Authorization (RMA) number. Pack the unit securely. Install the RMA number in **LARGE, BOLD** print on the outside of the shipping carton and ship the unit pre-paid and insured to:

Customer Service
RMA XXXX
Multi-Technical Services, Inc.
150 Clayton Commerce Center
Clayton, NC 27520
919-553-2995

Include with the unit a complete description of the difficulty and your return address.

Notice: MTS is not liable for any damage or loss of equipment in transit to MTS. MTS is not liable for any unit that is returned without a duly issued and properly displayed RMA number.

Section 9: Fips Index

000000 ALL USA

ALABAMA

001000 STATE WIDE
001001 AUTAUGA
001003 BALDWIN
001005 BARBOUR
001007 BIBB
001009 BLOUNT
001011 BULLOCK
001013 BUTLER
001015 CALHOUN
001017 CHAMBERS
001019 CHEROKEE
001021 CHILTON
001023 CHOCTAW
001025 CLARKE
001027 CLAY
001029 CLEBURNE
001031 COFFEE
001033 COLBERT
001035 CONECUH
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001039 COVINGTON
001041 CRENSHAW
001043 CULLMAN
001045 DALE
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001095 MARSHALL

001097 MOBILE
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001101 MONTGOMERY
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001105 PERRY
001107 PICKENS
001109 PIKE
001111 RANDOLPH
001113 RUSSELL
001115 ST CLAIR
001117 SHELBY
001119 SUMTER
001121 TALLADEGA
001123 TALLAPOOSA
001125 TUSCALOOSA
001127 WALKER
001129 WASHINGTON
001131 WILCOX
001133 WINSTON

ALASKA

002000 STATE WIDE
002010 ALEUTIAN ISLANDS
002020 ANCHORAGE
002050 BETHEL
002060 BRISTOL BAY
002070 DILLINGHAM
002090 FAIRBANKS NORTH
STAR
002100 HAINES
002110 JUNEAU
002122 KENAI PENINSULA
002130 KETCHIKAN
GATEWAY
002140 KOBUK
002150 KODIAK ISLAND
002170 MATANUSKA
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002180 NOME
002185 NORTH SLOPE
002201 PRINCE OF WALES
OUTER KETCHIKAN
002220 SITKA
002231 SKAGWAY YAKUTAT
ANGOON
002240 SOUTHEAST
FAIRBANKS
002261 VALDEZ CORDOVA
002270 WADE HAMPTON
002280 WRANGELL
PETERSBURG
002290 YUKON KOYUKUK

ARIZONA

004000 STATE WIDE
004001 APACHE
004003 COCHISE
004005 COCONINO
004007 GILA
004009 GRAHAM
004011 GREENLEE
004013 MARICOPA
004015 MOHAVE
004017 NAVAJO
004019 PIMA
004021 PINAL
004023 SANTA CRUZ
004025 YAVAPAI
004027 YUMA

ARKANSAS

005000 STATE WIDE
005001 ARKANSAS
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005005 BAXTER
005007 BENTON
005009 BOONE
005011 BRADLEY
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005017 CHICOT
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005051 GARLAND
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005063 INDEPENDENCE
005065 IZARD
005067 JACKSON
005069 JEFFERSON

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005135 SHARP
005137 STONE
005139 UNION
005141 VAN BUREN
005143 WASHINGTON
005145 WHITE
005147 WOODRUFF
005149 YELL

CALIFORNIA

006000 STATE WIDE
006001 ALAMEDA
006003 ALPINE
006005 AMADOR
006007 BUTTE
006009 CALAVERAS
006011 COLUSA
006013 CONTRA COSTA
006015 DEL NORTE
006017 EL DORADO
006019 FRESNO
006021 GLENN

006023 HUMBOLDT
006025 IMPERIAL
006027 INYO
006029 KERN
006031 KINGS
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006051 MONO
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006089 SHASTA
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006099 STANISLAUS
006101 SUTTER
006103 TEHAMA
006105 TRINITY
006107 TULARE
006109 TUOLUMNE
006111 VENTURA
006113 YOLO
006115 YUBA

COLORADO

008000 STATE WIDE
008001 ADAMS
008003 ALAMOSA
008005 ARAPAHOE
008007 ARCHULETA

008009 BACA
008011 BENT
008013 BOULDER
008015 CHAFFEE
008017 CHEYENNE
008019 CLEAR CREEK
008021 CONEJOS
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008025 CROWLEY
008027 CUSTER
008029 DELTA
008031 DENVER
008033 DOLORES
008035 DOUGLAS
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008063 KIT CARSON
008065 LAKE
008067 LA PLATA
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008079 MINERAL
008081 MOFFAT
008083 MONTEZUMA
008085 MONTROSE
008087 MORGAN
008089 OTERO
008091 OURAY
008093 PARK
008095 PHILLIPS
008097 PITKIN
008099 PROWERS
008101 PUEBLO
008103 RIO BLANCO
008105 RIO GRANDE
008107 ROUTT
008109 SAGUACHE
008111 SAN JUAN
008113 SAN MIGUEL
008115 SEDGWICK

008117 SUMMIT
008119 TELLER
008121 WASHINGTON
008123 WELD
008125 YUMA

CONNECTICUT

009000 STATE WIDE
009001 FAIRFIELD
009003 HARTFORD
009005 LITCHFIELD
009007 MIDDLESEX
009009 NEW HAVEN
009011 NEW LONDON
009013 TOLLAND
009015 WINDHAM
010000 ALL DELAW
010001 KENT
010003 NEW CASTLE
010005 SUSSEX

DC

011000 DISTRICT OF
COLUMBIA
011001 WASHINGTON

FLORIDA

012000 STATE WIDE
012001 ALACHUA
012003 BAKER
012005 BAY
012007 BRADFORD
012009 BREVARD
012011 BROWARD
012013 CALHOUN
012015 CHARLOTTE
012017 CITRUS
012019 CLAY
012021 COLLIER
012023 COLUMBIA
012025 DADE
012027 DE SOTO
012029 DIXIE
012031 DUVAL
012033 ESCAMBIA
012035 FLAGLER
012037 FRANKLIN
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012043 GLADES
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012047 HAMILTON
012049 HARDEE
012051 HENDRY

012053 HERNANDO
012055 HIGHLANDS
012057 HILLSBOROUGH
012059 HOLMES
012061 INDIAN RIVER
012063 JACKSON
012065 JEFFERSON
012067 LAFAYETTE
012069 LAKE
012071 LEE
012073 LEON
012075 LEVY
012077 LIBERTY
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012083 MARION
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012091 OKALOOSA
012093 OKEECHOBEE
012095 ORANGE
012097 OSCEOLA
012099 PALM BEACH
012101 PASCO
012103 PINELLAS
012105 POLK
012107 PUTNAM
012109 ST JOHNS
012111 ST LUCIE
012113 SANTA ROSA
012115 SARASOTA
012117 SEMINOLE
012119 SUMTER
012121 SUWANNEE
012123 TAYLOR
012125 UNION
012127 VOLUSIA
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012131 WALTON
012133 WASHINGTON

GEORGIA

013000 STATE WIDE
013001 APPLING
013003 ATKINSON
013005 BACON
013007 BAKER
013009 BALDWIN
013011 BANKS
013013 BARROW
013015 BARTOW
013017 BEN HILL
013019 BERRIEN

013021 BIBB
013023 BLECKLEY
013025 BRANTLEY
013027 BROOKS
013029 BRYAN
013031 BULLOCH
013033 BURKE
013035 BUTTS
013037 CALHOUN
013039 CAMDEN
013043 CANDLER
013045 CARROLL
013047 CATOOSA
013049 CHARLTON
013051 CHATHAM
013053 CHATTAHOOCHEE
013055 CHATTOOGA
013057 CHEROKEE
013059 CLARKE
013061 CLAY
013063 CLAYTON
013065 CLINCH
013067 COBB
013069 COFFEE
013071 COLQUITT
013073 COLUMBIA
013075 COOK
013077 COWETA
013079 CRAWFORD
013081 CRISP
013083 DADE
013085 DAWSON
013087 DECATUR
013089 DE KALB
013091 DODGE
013093 DOOLY
013095 DOUGHERTY
013097 DOUGLAS
013099 EARLY
013101 ECHOLS
013103 EFFINGHAM
013105 ELBERT
013107 EMANUEL
013109 EVANS
013111 FANNIN
013113 FAYETTE
013115 FLOYD
013117 FORSYTH
013119 FRANKLIN
013121 FULTON
013123 GILMER
013125 GLASCOCK
013127 GLYNN
013129 GORDON

013131 GRADY
013133 GREENE
013135 GWINNETT
013137 HABERSHAM
013139 HALL
013141 HANCOCK
013143 HARALSON
013145 HARRIS
013147 HART
013149 HEARD
013151 HENRY
013153 HOUSTON
013155 IRWIN
013157 JACKSON
013159 JASPER
013161 JEFF DAVIS
013163 JEFFERSON
013165 JENKINS
013167 JOHNSON
013169 JONES
013171 LAMAR
013173 LANIER
013175 LAURENS
013177 LEE
013179 LIBERTY
013181 LINCOLN
013183 LONG
013185 LOWNDES
013187 LUMPKIN
013189 MCDUFFIE
013191 MCINTOSH
013193 MACON
013195 MADISON
013197 MARION
013199 MERIWETHER
013201 MILLER
013205 MITCHELL
013207 MONROE
013209 MONTGOMERY
013211 MORGAN
013213 MURRAY
013217 NEWTON
013219 OCONEE
013221 OGLETHORPE
013223 PAULDING
013225 PEACH
013227 PICKENS
013229 PIERCE
013231 PIKE
013233 POLK
013235 PULASKI
013237 PUTNAM
013239 QUITMAN
013241 RABUN

013243 RANDOLPH
013245 RICHMOND
013247 ROCKDALE
013249 SCHLEY
013251 SCREVEN
013253 SEMINOLE
013255 SPALDING
013257 STEPHENS
013259 STEWART
013261 SUMTER
013263 TALBOT
013265 TALIAFERRO
013267 TATTNALL
013269 TAYLOR
013271 TELFAIR
013273 TERRELL
013275 THOMAS
013277 TIFT
013279 TOOMBS
013281 TOWNS
013283 TREUTLEN
013285 TROUP
013287 TURNER
013289 TWIGGS
013291 UNION
013293 UPSON
013295 WALKER
013297 WALTON
013299 WARE
013301 WARREN
013303 WASHINGTON
013305 WAYNE
013307 WEBSTER
013309 WHEELER
013311 WHITE
013313 WHITFIELD
013315 WILCOX
013317 WILKES
013319 WILKINSON
013321 WORTH
013510 COLUMBUS

HAWAII

015000 STATE WIDE
015001 HAWAII
015003 HONOLULU
015005 KALAWAO
015007 KAUAI
015009 MAUI
016000 ALL ID
016001 ADA
016003 ADAMS
016005 BANNOCK
016007 BEAR LAKE

016009 BENEWAH
016011 BINGHAM
016013 BLAINE
016015 BOISE
016017 BONNER
016019 BONNEVILLE
016021 BOUNDARY
016023 BUTTE
016025 CAMAS
016027 CANYON
016029 CARIBOU
016031 CASSIA
016033 CLARK
016035 CLEARWATER
016037 CUSTER
016039 ELMORE
016041 FRANKLIN
016043 FREMONT
016045 GEM
016047 GOODING
016049 IDAHO
016051 JEFFERSON
016053 JEROME
016055 KOOTENAI
016057 LATAH
016059 LEMHI
016061 LEWIS
016063 LINCOLN
016065 MADISON
016067 MINIDOKA
016069 NEZ PERCE
016071 ONEIDA
016073 OWYHEE
016075 PAYETTE
016077 POWER
016079 SHOSHONE
016081 TETON
016083 TWIN FALLS
016085 VALLEY
016087 WASHINGTON

ILLINOIS

017000 STATE WIDE
017001 ADAMS
017003 ALEXANDER
017005 BOND
017007 BOONE
017009 BROWN
017011 BUREAU
017013 CALHOUN
017015 CARROLL
017017 CASS
017019 CHAMPAIGN
017021 CHRISTIAN

017023 CLARK
017025 CLAY
017027 CLINTON
017029 COLES
017031 COOK
017033 CRAWFORD
017035 CUMBERLAND
017037 DE KALB
017039 DE WITT
017041 DOUGLAS
017043 DU PAGE
017045 EDGAR
017047 EDWARDS
017049 EFFINGHAM
017051 FAYETTE
017053 FORD
017055 FRANKLIN
017057 FULTON
017059 GALLATIN
017061 GREENE
017063 GRUNDY
017065 HAMILTON
017067 HANCOCK
017069 HARDIN
017071 HENDERSON
017073 HENRY
017075 IROQUOIS
017077 JACKSON
017079 JASPER
017081 JEFFERSON
017083 JERSEY
017085 JO DAVIESS
017087 JOHNSON
017089 KANE
017091 KANKAKEE
017093 KENDALL
017095 KNOX
017097 LAKE
017099 LA SALLE
017101 LAWRENCE
017103 LEE
017105 LIVINGSTON
017107 LOGAN
017109 MCDONOUGH
017111 MCHENRY
017113 MCLEAN
017115 MACON
017117 MACOUPIN
017119 MADISON
017121 MARION
017123 MARSHALL
017125 MASON
017127 MASSAC
017129 MENARD

017131 MERCER
017133 MONROE
017135 MONTGOMERY
017137 MORGAN
017139 MOULTRIE
017141 OGLE
017143 PEORIA
017145 PERRY
017147 PIATT
017149 PIKE
017151 POPE
017153 PULASKI
017155 PUTNAM
017157 RANDOLPH
017159 RICHLAND
017161 ROCK ISLAND
017163 ST CLAIR
017165 SALINE
017167 SANGAMON
017169 SCHUYLER
017171 SCOTT
017173 SHELBY
017175 STARK
017177 STEPHENSON
017179 TAZEWELL
017181 UNION
017183 VERMILION
017185 WABASH
017187 WARREN
017189 WASHINGTON
017191 WAYNE
017193 WHITE
017195 WHITESIDE
017197 WILL
017199 WILLIAMSON
017201 WINNEBAGO
017203 WOODFORD

INDIANA

018000 STATE WIDE
018001 ADAMS
018003 ALLEN
018005 BARTHOLOMEW
018007 BENTON
018009 BLACKFORD
018011 BOONE
018013 BROWN
018015 CARROLL
018017 CASS
018019 CLARK
018021 CLAY
018023 CLINTON
018025 CRAWFORD
018027 DAVIESS

018029 DEARBORN
018031 DECATUR
018033 DE KALB
018035 DELAWARE
018037 DUBOIS
018039 ELKHART
018041 FAYETTE
018043 FLOYD
018045 FOUNTAIN
018047 FRANKLIN
018049 FULTON
018051 GIBSON
018053 GRANT
018055 GREENE
018057 HAMILTON
018059 HANCOCK
018061 HARRISON
018063 HENDRICKS
018065 HENRY
018067 HOWARD
018069 HUNTINGTON
018071 JACKSON
018073 JASPER
018075 JAY
018077 JEFFERSON
018079 JENNINGS
018081 JOHNSON
018083 KNOX
018085 KOSCIUSKO
018087 LAGRANGE
018089 LAKE
018091 LA PORTE
018093 LAWRENCE
018095 MADISON
018097 MARION
018099 MARSHALL
018101 MARTIN
018103 MIAMI
018105 MONROE
018107 MONTGOMERY
018109 MORGAN
018111 NEWTON
018113 NOBLE
018115 OHIO
018117 ORANGE
018119 OWEN
018121 PARKE
018123 PERRY
018125 PIKE
018127 PORTER
018129 POSEY
018131 PULASKI
018133 PUTNAM
018135 RANDOLPH

018137 RIPLEY
018139 RUSH
018141 ST JOSEPH
018143 SCOTT
018145 SHELBY
018147 SPENCER
018149 STARKE
018151 STEUBEN
018153 SULLIVAN
018155 SWITZERLAND
018157 TIPPECANOE
018159 TIPTON
018161 UNION
018163 VANDERBURGH
018165 VERMILLION
018167 VIGO
018169 WABASH
018171 WARREN
018173 WARRICK
018175 WASHINGTON
018177 WAYNE
018179 WELLS
018181 WHITE
018183 WHITLEY

IOWA

019000 STATE WIDE
019001 ADAIR
019003 ADAMS
019005 ALLAMAKEE
019007 APPANOOSE
019009 AUDOBON
019011 BENTON
019013 BLACK HAWK
019015 BOONE
019017 BREMER
019019 BUCHANAN
019021 BUENA VISTA
019023 BUTLER
019025 CALHOUN
019027 CARROLL
019029 CASS
019031 CEDAR
019033 CERROGORDO
019035 CHEROKEE
019037 CHICKASAW
019039 CLARKE
019041 CLAY
019043 CLAYTON
019045 CLINTON
019047 CRAWFORD
019049 DALLAS
019051 DAVIS
019053 DECATUR

019055 DELAWARE
019057 DES MOINES
019059 DICKINSON
019061 DUBUQUE
019063 EMMET
019065 FAYETTE
019067 FLOYD
019069 FRANKLIN
019071 FREMONT
019073 GREENE
019075 GRUNDY
019077 GUTHRIE
019079 HAMILTON
019081 HANCOCK
019083 HARDIN
019085 HARRISON
019087 HENRY
019089 HOWARD
019091 HUMBOLDT
019093 IDA
019095 IOWA
019097 JACKSON
019099 JASPER
019101 JEFFERSON
019103 JOHNSON
019105 JONES
019107 KEOKUK
019109 KOSSUTH
019111 LEE
019113 LINN
019115 LOUISA
019117 LUCAS
019119 LYON
019121 MADISON
019123 MAHASKA
019125 MARION
019127 MARSHALL
019129 MILLS
019131 MITCHELL
019133 MONONA
019135 MONROE
019137 MONTGOMERY
019139 MUSCATINE
019141 O BRIEN
019143 OSCEOLA
019145 PAGE
019147 PALO ALTO
019149 PLYMOUTH
019151 POCAHONTAS
019153 POLK
019155 POTTAWATTAMIE
019157 POWESHIEK
019159 RINGGOLD
019161 SAC

019163 SCOTT
019165 SHELBY
019167 SIOUX
019169 STORY
019171 TAMA
019173 TAYLOR
019175 UNION
019177 VAN BUREN
019179 WAPELLO
019181 WARREN
019183 WASHINGTON
019185 WAYNE
019187 WEBSTER
019189 WINNEBAGO
019191 WINNESHIEK
019193 WOODBURY
019195 WORTH
019197 WRIGHT

KANSAS

020000 STATE WIDE
020001 ALLEN
020003 ANDERSON
020005 ATCHISON
020007 BARBER
020009 BARTON
020011 BOURBON
020013 BROWN
020015 BUTLER
020017 CHASE
020019 CHAUTAUQUA
020021 CHEROKEE
020023 CHEYENNE
020025 CLARK
020027 CLAY
020029 CLOUD
020031 COFFEY
020033 COMANCHE
020035 COWLEY
020037 CRAWFORD
020039 DECATUR
020041 DICKINSON
020043 DONIPHAN
020145 DOUGLAS
020047 EDWARDS
020049 ELK
020051 ELLIS
020053 ELLSWORTH
020055 FINNEY
020057 FORD
020059 FRANKLIN
020061 GEARY
020063 GOVE
020065 GRAHAM

020067 GRANT
020069 GRAY
020071 GREELEY
020073 GREENWOOD
020075 HAMILTON
020077 HARPER
020079 HARVEY
020081 HASKELL
020083 HODGEMAN
020085 JACKSON
020087 JEFFERSON
020089 JEWELL
020091 JOHNSON
020093 KEARNY
020095 KINGMAN
020097 KIOWA
020099 LABETTE
020101 LANE
020103 LEAVENWORTH
020105 LINCOLN
020107 LINN
020109 LOGAN
020111 LYON
020113 MCPHERSON
020115 MARION
020117 MARSHALL
020119 MEADE
020121 MIAMI
020123 MITCHELL
020125 MONTGOMERY
020127 MORRIS
020129 MORTON
020131 NEMAHA
020133 NEOSHO
020135 NESS
020137 NORTON
020139 OSAGE
020141 OSBORNE
020143 OTTAWA
020145 PAWNEE
020147 PHILLIPS
020149 POTTAWATOMIE
020151 PRATT
020153 RAWLINS
020155 RENO
020157 REPUBLIC
020159 RICE
020161 RILEY
020163 ROOKS
020165 RUSH
020167 RUSSELL
020169 SALINE
020171 SCOTT
020173 SEDGWICK

020175 SEWARD
020177 SHAWNEE
020179 SHERIDAN
020181 SHERMAN
020183 SMITH
020185 STAFFORD
020187 STANTON
020189 STEVENS
020191 SUMNER
020193 THOMAS
020195 TREGO
020197 WABAUNSEE
020199 WALLACE
020201 WASHINGTON
020203 WICHITA
020205 WILSON
020207 WOODSON
020209 WYANDOTTE

KENTUCKY

021000 STATE WIDE
021001 ADAIR
021003 ALLEN
021005 ANDERSON
021007 BALLARD
021009 BARREN
021011 BATH
021013 BELL
021015 BOONE
021017 BOURBON
021019 BOYD
021021 BOYLE
021023 BRACKEN
021025 BREATHITT
021027 BRECKINRIDGE
021029 BULLITT
021031 BUTLER
021033 CALDWELL
021035 CALLOWAY
021037 CAMPBELL
021039 CARLISLE
021041 CARROLL
021043 CARTER
021045 CASEY
021047 CHRISTIAN
021049 CLARK
021051 CLAY
021053 CLINTON
021055 CRITTENDEN
021057 CUMBERLAND
021059 DAVIESS
021061 EDMONSON
021063 ELLIOT
021065 ESTILL

021067 FAYETTE
021069 FLEMING
021071 FLOYD
021073 FRANKLIN
021075 FULTON
021077 GALLATIN
021079 GARRARD
021081 GRANT
021083 GRAVES
021085 GRAYSON
021087 GREEN
021089 GREENUP
021091 HANCOCK
021093 HARDIN
021095 HARLAN
021097 HARRISON
021099 HART
021101 HENDERSON
021103 HENRY
021105 HICKMAN
021107 HOPKINS
021109 JACKSON
021111 JEFFERSON
021113 JESSAMINE
021115 JOHNSON
021117 KENTON
021119 KNOTT
021121 KNOX
021123 LARUE
021125 LAUREL
021127 LAWRENCE
021129 LEE
021131 LESLIE
021133 LETCHER
021135 LEWIS
021137 LINCOLN
021139 LIVINGSTON
021141 LOGAN
021143 LYON
021145 MCCracken
021147 MCCREARY
021149 MCLEAN
021151 MADISON
021153 MAGOFFIN
021155 MARION
021157 MARSHALL
021159 MARTIN
021161 MASON
021163 MEADE
021165 MENIFEE
021167 MERCER
021169 METCALFE
021171 MONROE
021173 MONTGOMERY

021175 MORGAN
021177 MUHLENBERG
021179 NELSON
021181 NICHOLAS
021183 OHIO
021185 OLDHAM
021187 OWEN
021189 OWSLEY
021191 PENDLETON
021193 PERRY
021195 PIKE
021197 POWELL
021199 PULASKI
021201 ROBERTSON
021203 ROCKCASTLE
021205 ROWAN
021207 RUSSELL
021209 SCOTT
021211 SHELBY
021213 SIMPSON
021215 SPENCER
021217 TAYLOR
021219 TODD
021221 TRIGG
021223 TRIMBLE
021225 UNION
021227 WARREN
021229 WASHINGTON
021231 WAYNE
021233 WEBSTER
021235 WHITLEY
021237 WOLFE
021239 WOODFORD

LOUSIANA

022000 STATE WIDE
022001 ACADIA
022003 ALLEN
022005 ASCENSION
022007 ASSUMPTION
022009 AVOYELLES
022011 BEAUREGARD
022013 BIENVILLE
022015 BOSSIER
022017 CADDO
022019 CALCASIEU
022021 CALDWELL
022023 CAMERON
022025 CATAHOULA
022027 CLAIBORNE
022029 CONCORDIA
022031 DE SOTO
022033 EAST BATON ROUGE
022035 EAST CARROLL

022037 EASR FELICIANA
022039 EVANGELINE
022041 FRANKLIN
022043 GRANT
022045 IBERIA
022047 IBERVILLE
022049 JACKSON
022051 JEFFERSON
022053 JEFFERSON DAVIS
022055 LAFAYETTE
022057 LAFOURCHE
022059 LA SALLE
022061 LINCOLN
022063 LIVINGSTON
022065 MADISON
022067 MOREHOUSE
022069 NATCHITOCHES
022071 ORLEANS
022073 OUACHITA
022075 PLAQUEMINES
022077 POINTE COUPEE
022079 RAPIDES
022081 RED RIVER
022063 RICHLAND
022085 SABINE
022087 ST BERNARD
022089 ST CHARLES
022091 ST HELENA
022093 ST JAMES
022095 ST JOHN THE
BAPTIST
022097 ST LANDRY
022099 ST MARTIN
022101 ST MARY
022103 ST TAMMANY
022105 TANGIPAHOA
022107 TENSAS
022109 TERREBONNE
022111 UNION
022113 VERMILION
022115 VERNON
022117 WASHINGTON
022119 WEBSTER
022121 WEST BATON
ROUGE
022123 WEST CARROLL
022125 WEST FELICIANA
022127 WINN

MAINE

023000 STATE WIDE
023001 ANDROSCOGGIN
023003 AROOSTOOK
023005 CUMBERLAND

023007 FRANKLIN
023009 HANCOCK
023011 KENNEBEC
023013 KNOX
023015 LINCOLN
023017 OXFORD
023019 PENOBSCOT
023021 PISCATAQUIS
023023 SAGADAHOC
023025 SOMERSET
023027 WALDO
023029 WASHINGTON
023031 YORK

MARYLAND

024000 STATE WIDE
024001 ALLEGANY
024003 ANNE ARUNDEL
024005 BALTIMORE
024009 CALVERT
024011 CAROLINE
024013 CARROLL
024015 CECIL
024017 CHARLES
024019 DORCHESTER
024021 FREDERICK
024023 GARRETT
024025 HARFORD
024027 HOWARD
024029 KENT
024031 MONTGOMERY
024033 PRINCE GEORGES
024035 QUEEN ANNES
024037 ST MARYS
024039 SOMERSET
024041 TALBOT
024043 WASHINGTON
024045 WICOMICO
024047 WORCESTER
024510 BALTIMORE COTY

MASSACHUSETTS

025000 STATE WIDE
025001 BARNSTABLE
025003 BERKSHIRE
025005 BRISTOL
025007 DUKES
025009 ESSEX
025011 FRANKLIN
025013 HAMPDEN
025015 HAMPSHIRE
025017 MIDDLESEX
025019 NANTUCKET
025021 NORFOLK

025023 PLYMOUTH
025025 SUFFOLK
025027 WORCESTER

MICHIGAN

026000 STATE WIDE
026001 ALCONA
026003 ALGER
026005 ALLEGAN
026007 ALPENA
026009 ANTRIM
026011 ARENAC
026013 BARAGA
026015 BARRY
026017 BAY
026019 BENZIE
026021 BERRIEN
026023 BRANCH
026025 CALHOUN
026027 CASS
026029 CHARLEVOIX
026031 CHEBOYGAN
026033 CHIPPEWA
026035 CLARE
026037 CLINTON
026039 CRAWFORD
026041 DELTA
026043 DICKINSON
026045 EATON
026047 EMMET
026049 GENESEE
026051 GLADWIN
026053 GOGEBIC
026055 GRAND TRAVERSE
026057 GRATIOT
026059 HILLSDALE
026061 HOUGHTON
026063 HURON
026065 INGHAM
026067 IONIA
026069 IOSCO
026071 IRON
026073 ISABELLA
026075 JACKSON
026077 KALAMAZOO
026079 KALKASKA
026081 KENT
026083 KEWEENAW
026085 LAKE
026087 LAPEER
026089 LEELANAU
026091 LENAWEE
026093 LIVINGSTON
026095 LUCE

026097 MACKINAC
026099 MACOMB
026101 MANISTEE
026103 MARQUETTE
026105 MASON
026107 MECOSTA
026109 MENOMINEE
026111 MIDLAND
026113 MISSAUKEE
026115 MONROE
026117 MONTCALM
026119 MONTMORENCY
026121 MUSKOGON
026123 NEWAYGO
026125 OAKLAND
026127 OCEANA
026129 OGEMAW
026131 ONTONAGON
026133 OSCEOLA
026135 OSCODA
026137 OTSEGO
026139 OTTAWA
026141 PRESQUE
026143 ROSCOMMON
026145 SAGINAW
026147 ST CLAIR
026149 ST JOSEPH
026151 SANILAC
026153 SCHOOLCRAFT
026155 SHIAWASSEE
026157 TUSCOLA
026159 VAN BUREN
026161 WASHTENAW
026163 WAYNE
026165 WEXFORD

MINNESOTA

027000 STATE WIDE
027001 AITKIN
027003 ANOKA
027005 BECKER
027007 BELTRAMI
027009 BENTON
027011 BIG STONE
027013 BLUE EARTH
027015 BROWN
027017 CARLTON
027019 CARVER
027021 CASS
027023 CHIPPEWA
027025 CHISAGO
027027 CLAY
027029 CLEARWATER
027031 COOK

027033 COTTONWOOD
027035 CROW WING
027037 DAKOTA
027039 DODGE
027041 DOUGLAS
027043 FARIBAULT
027045 FILLMORE
027047 FREEBORN
027049 GOODHUE
027051 GRANT
027053 HENNEPIN
027055 HOUSTON
027057 HUBBARD
027059 ISANTI
027061 ITASCA
027063 JACKSON
027065 KANABEC
027067 KANDIYOH
027069 KITTSO
027071 KOCHICHING
027073 LAC QUI PARLE
027075 LAKE
027077 LAKE OF THE
WOODS
027079 LE SUEUR
027081 LINCOLN
027083 LYON
027085 MCLEOD
027087 MAHNOMEN
027089 MARSHALL
027091 MARTIN
027093 MEEKER
027095 MILLE LACS
027097 MORRISON
027099 MOWER
027101 MURRAY
027103 NICOLLET
027105 NOBLES
027107 NORMAN
027109 OLMSTED
027111 OTTER TAIL
027113 PENNINGTON
027115 PINE
027117 PIPESTONE
027119 POLK
027121 POPE
027123 RAMSEY
027125 RED LAKE
027127 REDWOOD
027129 RENVILLE
027131 RICE
027133 ROCK
027135 ROSEAU
027137 ST LOUIS

027139 SCOTT
027141 SHERBURNE
027143 SIBLEY
027145 STEARNS
027147 STEELE
027149 STEVENS
027151 SWIFT
027153 TODD
027155 TRAVERSE
027157 WABASHA
027159 WADENA
027161 WASECA
027163 WASHINGTON
027165 WATONWAN
027167 WILKIN
027169 WINONA
027171 WRIGHT
027173 YELLOW MEDICINE

MISSISSIPPI

028000 STATE WIDE
028001 ADAMS
028003 ALCORN
028005 AMITE
028007 ATTALA
028009 BENTON
028011 BOLIVAR
028013 CALHOUN
028015 CARROLL
028017 CHICKASAW
028019 CHOCTAW
028021 CLAIBORNE
028023 CLARKE
028025 CLAY
028027 COAHOMA
028029 COPIAH
028031 COVINGTON
028033 DE SOTO
028035 FORREST
028037 FRANKLIN
028039 GEORGE
028041 GREENE
028043 GRENADA
028045 HANCOCK
028047 HARRISON
028049 HINDS
028051 HOLMES
028053 HUMPHREYS
028055 ISSAQUENA
028057 ITAWAMBA
028059 JACKSON
028061 JASPER
028063 JEFFERSON
028065 JEFFERSON DAVIS

028067 JONES
028069 KEMPER
028071 LAFAYETTE
028073 LAMAR
028075 LAUDERDALE
028077 LAWRENCE
028079 LEAKE
028081 LEE
028083 LEFLORE
028085 LINCOLN
028087 LOWNDES
028089 MADISON
028091 MARION
028093 MARSHALL
028095 MONROE
028097 MONTGOMERY
028099 NESHIBA
028101 NEWTON
028103 NOXUBEE
028105 OKTIBBEHA
028107 PANOLA
028109 PEARL RIVER
028111 PERRY
028113 PIKE
028115 PONTOTOC
028117 PRENTISS
028119 QUITMAN
028121 RANKIN
028123 SCOTT
028125 SHARKEY
028127 SIMPSON
028129 SMITH
028131 STONE
028133 SUNFLOWER
028135 TALLAHATCHIE
028137 TATE
028139 TIPPAAH
028141 TISHOMINGO
028143 TUNICA
028145 UNION
028147 WALTHALL
028149 WARREN
028151 WASHINGTON
028153 WAYNE
028155 WEBSTER
028157 WILKINSON
028159 WINSTON
028161 YALOBUSHA
028163 YAZOO

MISSOURI

029000 STATE WIDE
029001 ADAIR
029003 ANDREW

029005 ATCHISON
029007 AUDRAIN
029009 BARRY
029011 BARTON
029013 BATES
029015 BENTON
029017 BOLLINGER
029019 BOONE
029021 BUCHANAN
029023 BUTLER
029025 CALDWELL
029027 CALLAWAY
029029 CAMDEN
029031 CAPE GIRARDEAU
029033 CARROLL
029035 CARTER
029037 CASS
029039 CEDAR
029041 CHARITON
029043 CHRISTIAN
029045 CLARK
029047 CLAY
029049 CLINTON
029051 COLE
029053 COOPER
029055 CRAWFORD
029057 DADE
029059 DALLAS
029061 DAVIESS
029063 DE KALB
029065 DENT
029067 DOUGLAS
029069 DUNKLIN
029071 FRANKLIN
029073 GASCONADE
029075 GENTRY
029077 GREENE
029079 GRUNDY
029081 HARRISON
029083 HENRY
029085 HICKORY
029087 HOLT
029089 HOWARD
029091 HOWELL
029093 IRON
029095 JACKSON
029097 JASPER
029099 JEFFERSON
029101 JOHNSON
029103 KNOX
029105 LACLEDE
029107 LAFAYETTE
029109 LAWRENCE
029111 LEWIS

029113 LINCOLN
029115 LINN
029117 LIVINGSTON
029119 MCDONALD
029121 MACON
029123 MADISON
029125 MARIES
029127 MARION
029129 MERCER
029131 MILLER
029133 MISSISSIPPI
029135 MONITEAU
029137 MONROE
029139 MONTGOMERY
029141 MORGAN
029143 NEW MADRID
029145 NEWTON
029147 NODAWAY
029149 OREGON
029151 OSAGE
029153 PEMISCOT
029157 PERRY
029159 PETTIS
029161 PHELPS
029163 PIKE
029165 PLATTE
029167 POLK
029169 PULASKI
029171 PUTNAM
029173 RALLS
029175 RANDOLPH
029177 RAY
029179 REYNOLDS
029181 RIPLEY
029183 ST CHARLES
029185 ST CLAIR
029186 STE GENEVIEVE
029187 ST FRANCOIS
029189 ST LOUIS
029195 SALINE
029197 SCHUYLER
029199 SCOTLAND
029201 SCOTT
029203 SHANNON
029205 SHELBY
029207 STODDARD
029209 STONE
029211 SULLIVAN
029213 TANEY
029215 TEXAS
029217 VERNON
029219 WARREN
029221 WASHINGTON
029223 WAYNE

029225 WEBSTER
029227 WORTH
029229 WRIGHT
029510 ST LOUIS CITY

MONTANA

030000 STATE WIDE
030001 BEAVERHEAD
030003 BIG HORN
030005 BLAINE
030007 BROADWATER
030009 CARBON
030011 CARTER
030013 CASCADE
030015 CHOUTEAU
030017 CUSTER
030019 DANIELS
030021 DAWSON
030023 DEER LODGE
030025 FALLON
030027 FERGUS
030029 FLATHEAD
030031 GALLATIN
030033 GARFIELD
030035 GLACIER
030037 GOLDEN VALLEY
030039 GRANITE
030041 HILL
030043 JEFFERSON
030045 JUDITH BASIN
030047 LAKE
030049 LEWIS AND CLARKE
030051 LIBERTY
030053 LINCOLN
030055 MCCONE
030057 MADISON
030059 MEAGHER
030061 MINERAL
030063 MISSOULA
030065 MUSSELSHELL
030067 PARK
030069 PETROLEUM
030071 PHILLIPS
030073 PONDERA
030075 POWDER RIVER
030077 POWELL
030079 PRAIRIE
030081 RAVALLI
030083 RICHLAND
030085 ROOSEVELT
030087 ROSEBUD
030089 SANDERS
030091 SHERIDAN
030093 SILVER BOW

030095 STILLWATER
030097 SWEET GRASS
030099 TETON
030101 TOOLE
030103 TREASURE
030105 VALLEY
030107 WHEATLAND
030109 WIBAUX
030111 YELLOWSTONE
030113 YELLOWSTONE
NATIONAL PARK

NEBRASKA

031000 STATE WIDE
031001 ADAMS
031003 ANTELOPE
031005 ARTHUR
031007 BANNER
031009 BLAINE
031011 BOONE
031013 BOX BUTTE
031015 BOYD
031017 BROWN
031019 BUFFALO
031021 BURT
031023 BUTLER
031025 CASS
031027 CEDAR
031029 CHASE
031031 CHERRY
031033 CHEYENNE
031035 CLAY
031037 COLFAX
031039 CUMING
031041 CUSTER
031043 DAKOTA
031045 DAWES
031047 DAWSON
031049 DEUEL
031051 DIXON
031053 DODGE
031055 DOUGLAS
031057 DUNDY
031059 FILLMORE
031061 FRANKLIN
031063 FRONTIER
031065 FURNAS
031067 GAGE
031069 GARDEN
031071 GARFIELD
031073 GOSPER
031075 GRANT
031077 GREELEY
031079 HALL

031081 HAMILTON
031083 HARLAN
031085 HAYES
031087 HITCHCOCK
031089 HOLT
031091 HOOKER
031093 HOWARD
031095 JEFFERSON
031097 JOHNSON
031099 KEARNEY
031101 KEITH
031103 KEYA PAHA
031105 KIMBALL
031107 KNOX
031109 LANCASTER
031111 LINCOLN
031113 LOGAN
031115 LOUP
031117 MCPHERSON
031119 MADISON
031121 MERRICK
031123 MORRILL
031125 NANCE
031127 NEMAHA
031129 NUCKOLLS
031131 OTOE
031133 PAWNEE
031135 PERKINS
031137 PHELPS
031139 PIERCE
031141 PLATTE
031143 POLK
031145 RED WILLOW
031147 RICHARDSON
031149 ROCK
031151 SALINE
031153 SARPY
031155 SAUNDERS
031157 SCOTTS BLUFF
031159 SEWARD
031161 SHERIDAN
031163 SHERMAN
031165 SIOUX
031167 STANTON
031169 THAYER
031171 THOMAS
031173 THURSTON
031175 VALLEY
031177 WASHINGTON
031179 WAYNE
031181 WEBSTER
031183 WHEELER
031185 YORK

NEVADA
032000 STATE WIDE
032001 CHURCHILL
032003 CLARK
032005 DOUGLAS
032007 ELKO
032009 ESMERALDA
032011 EUREKA
032013 HUMBOLDT
032015 LANDER
032017 LINCOLN
032019 LYON
032021 MINERAL
032023 NYE
032027 PERSHING
032029 STOREY
032031 WASHOE
032033 WHITE PINE
032510 CARSON CITY

NEW HAMPSHIRE
033000 STATE WIDE
033001 BELKNAP
033003 CARROLL
033005 CHESHIRE
033007 COOS
033009 GRAFTON
033011 HILLSBOROUGH
033013 MERRIMACK
033015 ROCKINGHAM
033017 STRAFFORD
033019 SULLIVAN

NEW JERSEY
034000 STATE WIDE
034001 ATLANTIC
034003 BERGEN
034005 BURLINGTON
034007 CAMDEN
034009 CAPE MAY
034011 CUMBERLAND
034013 ESSEX
034015 GLOUCESTER
034017 HUDSON
034019 HUNTERDON
034021 MERCER
034023 MIDDLESEX
034025 MONMOUTH
034027 MORRIS
034029 OCEAN
034031 PASSAIC
034033 SALEM
034035 SOMERSET
034037 SUSSEX

034039 UNION
034041 WARREN

NEW MEXICO
035000 STATE WIDE
035001 BERNALILLO
035003 CATRON
035005 CHAVES
035007 COLFAX
035009 CURRY
035011 DE BACA
035013 DONA ANA
035015 EDDY
035017 GRANT
035019 GUADALUPE
035021 HARDING
035023 HIDALGO
035025 LEA
035027 LINCOLN
035028 LOS ALAMOS
035029 LUNA
035031 MCKINLEY
035033 MORA
035035 OTERO
035037 QUAY
035039 RIO ARRIBA
035041 ROOSEVELT
035043 SANDOVAL
035045 SAN JUAN
035047 SAN MIGUEL
035049 SANTA FE
035051 SIERRA
035053 SOCORRO
035055 TAOS
035057 TORRANCE
035059 UNION
035061 VALENCIA

NEW YORK
036000 STATE WIDE
036001 ALBANY
036003 ALLEGANY
036005 BRONX
036007 BROOME
036009 CATTARAUGUS
036011 CAYUGA
036013 CHAUTAUQUA
036015 CHEMUNG
036017 CHENANGO
036019 CLINTON
036021 COLUMBIA
036023 CORTLAND
036025 DELAWARE
036027 DUTCHESS

036029 ERIE
036031 ESSEX
036033 FRANKLIN
036035 FULTON
036037 GENESEE
036039 GREENE
036041 HAMILTON
036043 HERKIMER
036045 JEFFERSON
036047 KINGS
036049 LEWIS
036051 LIVINGSTON
036053 MADISON
036055 MONROE
036057 MONTGOMERY
036059 NASSAU
036061 NEW YORK
036063 NIAGARA
036065 ONEIDA
036067 ONONDAGA
036069 ONTARIO
036071 ORANGE
036073 ORLEANS
036075 OSWEGO
036077 OTSEGO
036079 PUTNAM
036081 QUEENS
036083 RENSSELAER
036085 RICHMOND
036087 ROCKLAND
036089 ST LAWRENCE
036091 SARATOGA
036093 SCHENECTADY
036095 SCHOHARIE
036097 SCHUYLER
036099 SENECA
036101 STEUBEN
036103 SUFFOLK
036105 SULLIVAN
036107 TIOGA
036109 TOMPKINS
036111 ULSTER
036113 WARREN
036115 WASHINGTON
036117 WAYNE
036119 WESTCHESTER
036121 WYOMING
036123 YATES

NORTH CAROLINA

037000 STATE WIDE
037001 ALAMANCE
037003 ALEXANDER
037005 ALLEGHANY

037007 ANSON
037009 ASHE
037011 AVERY
037013 BEAUFORT
037015 BERTIE
037017 BLADEN
037019 BRUNSWICK
037021 BUNCOMBE
037023 BURKE
037025 CABARRUS
037027 CALDWELL
037029 CAMDEN
037031 CARTERET
037033 CASWELL
037035 CATAWBA
037037 CHATHAM
037039 CHEROKEE
037041 CHOWAN
037043 CLAY
037045 CLEVELAND
037047 COLUMBUS
037049 CRAVEN
037051 CUMBERLAND
037053 CURRITUCK
037055 DARE
037057 DAVIDSON
037059 DAVIE
037061 DUPLIN
037063 DURHAM
037065 EDGEcombe
037067 FORSYTH
037069 FRANKLIN
037071 GASTON
037073 GATES
037075 GRAHAM
037077 GRANVILLE
037079 GREENE
037081 GUILFORD
037083 HALIFAX
037085 HARNETT
037087 HAYWOOD
037089 HENDERSON
037091 HERTFORD
037093 HOKE
037095 HYDE
037097 IREDELL
037099 JACKSON
037101 JOHNSTON
037103 JONES
037105 LEE
037107 LENOIR
037109 LINCOLN
037111 MCDOWELL
037113 MACON

037115 MADISON
037117 MARTIN
037119 MECKLINBURG
037121 MITCHELL
037123 MONTGOMERY
037125 MOORE
037127 NASH
037129 NEW HANOVER
037131 NORTHAMPTON
037133 ONSLOW
037135 ORANGE
037137 PAMLICO
037139 PASQUOTANK
037141 PENDER
037143 PERQUIMANS
037145 PERSON
037147 PITT
037149 POLK
037151 RANDOLPH
037153 RICHMOND
037155 ROBESON
037157 ROCKINGHAM
037159 ROWAN
037161 RUTHERFORD
037163 SAMPSON
037165 SCOTLAND
037167 STANLY
037169 STOKES
037171 SURRY
037173 SWAIN
037175 TRANSYLVANIA
037177 TYRRELL
037179 UNION
037181 VANCE
037183 WAKE
037185 WARREN
037187 WASHINGTON
037189 WATAUGA
037191 WAYNE
037193 WILKES
037195 WILSON
037197 YADKIN
037199 YANCEY

NORTH DAKOTA

038000 STATE WIDE
038001 ADAMS
038003 BARNES
038005 BENSON
038007 BILLINGS
038009 BOTTINEAU
038011 BOWMAN
038013 BURKE
038015 BURLEIGH

038017 CASS
038019 CAVALIER
038021 DICKEY
038023 DIVIDE
038025 DUNN
038027 EDDY
038029 EMMONS
038031 FOSTER
038033 GOLDEN VALLEY
038035 GRAND FORKS
038037 GRANT
038039 GRIGGS
038041 HETTINGER
038043 KIDDER
038045 LA MOURE
038047 LOGAN
038049 MCHENRY
038051 MCINTOSH
038053 MCKENZIE
038055 MCLEAN
038057 MERCER
038059 MORTON
038061 MOUNTRIAL
038063 NELSON
038065 OLIVER
038067 PEMBINA
038069 PIERCE
038071 RAMSEY
038073 RANSOM
038075 RENVILLE
038077 RICHLAND
038079 ROLETTE
038081 SARGENT
038083 SHERIDAN
038085 SIOUX
038087 SLOPE
038089 STARK
038091 STEELE
038093 STUTSMAN
038095 TOWNER
038097 TRAILL
038099 WALSH
038101 WARD
038103 WELLS
038105 WILLIAMS

OHIO

039000 STATE WIDE
039001 ADAMS
039003 ALLEN
039005 ASHLAND
039007 ASHTABULA
039009 ATHENS
039011 AUGLAIZE

039013 BELMONT
039015 BROWN
039017 BUTLER
039019 CARROLL
039021 CHAMPAIGN
039023 CLARK
039025 CLERMONT
039027 CLINTON
039029 COLUMBIANA
039031 COSHOCTON
039033 CRAWFORD
039035 CUYAHOGA
039037 DARKE
039039 DEFIANCE
039041 DELAWARE
039043 ERIE
039045 FAIRFIELD
039047 FAYETTE
039049 FRANKLIN
039051 FULTON
039053 GALLIA
039055 GEAUGA
039057 GREENE
039059 GUERNSEY
039061 HAMILTON
039063 HANCOCK
039065 HARDIN
039067 HARRISON
039069 HENRY
039071 HIGHLAND
039073 HOCKING
039075 HOLMES
039077 HURON
039079 JACKSON
039081 JEFFERSON
039083 KNOX
039085 LAKE
039087 LAWRENCE
039089 LICKING
039091 LOGAN
039093 LORAIN
039095 MADISON
039099 MAHONING
039101 MARION
039103 MEDINA
039105 MEIGS
039107 MERCER
039109 MIAMI
039111 MONROE
039113 MONTGOMERY
039115 MORGAN
039117 MORROW
039119 MUSKINGUM
039121 NOBLE

039123 OTTAWA
039125 PAULDING
039127 PERRY
039129 PICKAWAY
039131 PIKE
039133 PORTAGE
039135 PREBLE
039137 PUTNAM
039139 RICHLAND
039141 ROSS
039143 SANDUSKY
039145 SCIOTO
039147 SENECA
039149 SHELBY
039151 STARK
039153 SUMMIT
039155 TRUMBULL
039157 TUSCARAWAS
039159 UNION
039161 VAN WERT
039163 VINTON
039165 WARREN
039167 WASHINGTON
039169 WAYNE
039171 WILLIAMS
039173 WOOD
039175 WYANDOT

OKLAHOMA

040000 STATE WIDE
040001 ADAIR
040003 ALFALFA
040005 ATOKA
040007 BEAVER
040009 BECKHAM
040011 BLAINE
040013 BRYAN
040015 CADDO
040017 CANADIAN
040019 CARTER
040021 CHEROKEE
040023 CHOCTAW
040025 CIMARRON
040027 CLEVELAND
040029 COAL
040031 COMANCHE
040033 COTTON
040035 CRAIG
040037 CREEK
040039 CUSTER
040041 DELAWARE
040043 DEWEY
040045 ELLIS
040047 GARFIELD

040049 GARVIN
040051 GRADY
040053 GRANT
040055 GREER
040057 HARMON
040059 HARPER
040061 HASKELL
040063 HUGHES
040065 JACKSON
040067 JEFFERSON
040069 JOHNSTON
040071 KAY
040073 KINGFISHER
040075 KIOWA
040077 LATIMER
040079 LE FLORE
040081 LINCOLN
040083 LOGAN
040085 LOVE
040087 MCCLAIN
040089 MCCURTAIN
040091 MCINTOSH
040093 MAJOR
040095 MARSHALL
040097 MAYES
040099 MURRAY
040101 MUSKOGEE
040103 NOBLE
040105 NOWATA
040107 OKFUSKEE
040109 OKLAHOMA
040111 OKMULGEE
040113 OSAGE
040115 OTTAWA
040117 PAWNEE
040119 PAYNE
040121 PITTSBURG
040123 PONTOTOC
040125 POTTAWATOMIE
040127 PUSHMATAHA
040129 ROGER MILLS
040131 ROGERS
040133 SEMINOLE
040135 SEQUOYAH
040137 STEPHENS
040139 TEXAS
040141 TILLMAN
040143 TULSA
040145 WAGONER
040147 WASHINGTON
040149 WASHITA
040151 WOODS
040153 WOODWARD

OREGON

041000 STATE WIDE
041001 BAKER
041003 BENTON
041005 CLACKAMAS
041007 CLATSOP
041009 COLUMBIA
041011 COOS
041013 CROOK
041015 CURRY
041017 DESCHUTES
041019 DOUGLAS
041021 GILLIAM
041023 GRANT
041025 HARNEY
041027 HOOD RIVER
041029 JACKSON
041031 JEFFERSON
041033 JOSEPHINE
041035 KLAMATH
041037 LAKE
041039 LANE
041041 LINCOLN
041043 LINN
041045 MALHEUR
041047 MARION
041049 MORROW
041051 MULTNOMAH
041153 POLK
041055 SHERMAN
041057 TILLAMOOK
041059 UMATILLA
041061 UNION
041063 WALLOWA
041065 WASCO
041067 WASHINGTON
041069 WHEELER
041071 YAMHILL

PENNSYLVANIA

042000 STATE WIDE
042001 ADAMS
042003 ALLEGHENY
042005 ARMSTRONG
042007 BEAVER
042009 BEDFORD
042011 BERKS
042013 BLAIR
042015 BRADFORD
042017 BUCKS
042019 BUTLER
042021 CAMBRIA
042023 CAMERON
042025 CARBON

042027 CENTRE
042029 CHESTER
042031 CLARION
042033 CLEARFIELD
042035 CLINTON
042037 COLUMBIA
042039 CRAWFORD
042041 CUMBERLAND
042043 DAUPHIN
042045 DELAWARE
042047 ELK
042049 ERIE
042051 FAYETTE
042053 FOREST
042055 FRANKLIN
042057 FULTON
042059 GREENE
042061 HUNTINGDON
042063 INDIANA
042065 JEFFERSON
042067 JUNIATA
042069 LACKAWANNA
042071 LANCASTER
042073 LAWRENCE
042075 LEBANON
042077 LEHIGH
042079 LUZERNE
042081 LYCOMING
042083 MCKEAN
042085 MERCER
042087 MIFFLIN
042089 MONROE
042091 MONTGOMERY
042093 MONTOUR
042095 NORTHAMPTON
042097 NORTHUMBERLAND
042099 PERRY
042101 PHILADELPHIA
042103 PIKE
042105 POTTER
042107 SCHUYLKILL
042109 SNYDER
042111 SOMERSET
042113 SULLIVAN
042115 SUSQUEHANNA
042117 TIOGA
042119 UNION
042121 VENANGO
042123 WARREN
042125 WASHINGTON
042127 WAYNE
042129 WESTMORELAND
042131 WYOMING
042133 YORK

RHODE ISLAND

043000 STATE WIDE
043001 BRISTOL
043003 KENT
043005 NEWPORT
043007 PROVIDENCE
043009 WASHINGTON

SOUTH CAROLINA

045000 STATE WIDE
045001 ABBEVILLE
045003 AIKEN
045005 ALLENDALE
045007 ANDERSON
045009 BAMBERG
045011 BARNWELL
045013 BEAUFORT
045015 BERKELEY
045017 CALHOUN
045019 CHARLESTON
045021 CHEROKEE
045023 CHESTER
045025 CHESTERFIELD
045027 CLARENDON
045029 COLLETON
045031 DARLINGTON
045033 DILLON
045035 DORCHESTER
045037 EDGEFIELD
045039 FAIRFIELD
045041 FLORENCE
045043 GEORGETOWN
045045 GREENVILLE
045047 GREENWOOD
045049 HAMPTON
045051 HORRY
045053 JASPER
045055 KERSHAW
045057 LANCASTER
045059 LAURENS
045061 LEE
045063 LEXINGTON
045065 MCCORMICK
045067 MARION
045069 MARLBORO
045071 NEWBERRY
045073 OCONEE
045075 ORANGEBURG
045077 PICKENS
045079 RICHLAND
045081 SALUDA
045083 SPARTANBURG
045085 SUMTER

045087 UNION
045089 WILLIAMSBURG
045091 YORK

SOUTH DAKOTA

046000 STATE WIDE
046003 AURORA
046005 BEADLE
046007 BENNETT
046009 BON HOMME
046011 BROOKINGS
046013 BROWN
046015 BRULE
046017 BUFFALO
046019 BUTTE
046021 CAMPBELL
046023 CHARLES MIX
046025 CLARK
046027 CLAY
046029 CODINGTON
046031 CORSON
046033 CUSTER
046035 DAVISON
046037 DAY
046039 DEUEL
046041 DEWEY
046043 DOUGLAS
046045 EDMUNDS
046047 FALL RIVER
046049 FAULK
046051 GRANT
046053 GREGORY
046055 HAAKON
046057 HAMLIN
046059 HAND
046061 HANSON
046063 HARDING
046065 HUGHES
046067 HUTCHINSON
046069 HYDE
046071 JACKSON
046073 JERAULD
046075 JONES
046077 KINGSBURY
046079 LAKE
046081 LAWRENCE
046083 LINCOLN
046085 LYMAN
046087 MCCOOK
046089 MCPHERSON
046091 MARSHALL
046093 MEADE
046095 MELLETTE
046097 MINER

046099 MINNEHAHA
046101 MOODY
046103 PENNINGTON
046105 PERKINS
046107 POTTER
046109 ROBERTS
046111 SANBORN
046113 SHANNON
046115 SPINK
046117 STANLEY
046119 SULLY
046121 TODD
046123 TRIPP
046125 TURNER
046127 UNION
046129 WALWORTH
046135 YANKTON
046137 ZIEBACH

TENNESSEE

047000 STATE WIDE
047001 ANDERSON
047003 BEDFORD
047005 BENTON
047007 BLEDSOE
047009 BLOUNT
047011 BRADLEY
047013 CAMPBELL
047015 CANNON
047017 CARROLL
047019 CARTER
047021 CHEATHAM
047023 CHESTER
047025 CLAIBORNE
047027 CLAY
047029 COCKE
047031 COFFEE
047033 CROCKET
047035 CUMBERLAND
047037 DAVIDSON
047039 DECATUR
047041 DE KALB
047043 DICKSON
047045 DYER
047047 FAYETTE
047049 FENTRESS
047051 FRANKLIN
047053 GIBSON
047055 GILES
047057 GRAINGER
047059 GREENE
047061 GRUNDY
047063 HAMBLIN
047065 HAMILTON

047067 HANCOCK
047069 HARDEMAN
047071 HARDIN
047073 HAWKINS
047075 HAYWOOD
047077 HENDERSON
047079 HENRY
047081 HICKMAN
047083 HOUSTON
047085 HUMPHREYS
047087 JACKSON
047089 JEFFERSON
047091 JOHNSON
047093 KNOX
047095 LAKE
047097 LAUDERDALE
047099 LAWRENCE
047101 LEWIS
047103 LINCOLN
047105 LOUDON
047107 MCMINN
047109 MCNAIRY
047111 MACON
047113 MADISON
047115 MARION
047117 MARSHALL
047119 MAURY
047121 MEIGS
047123 MONROE
047125 MONTGOMERY
047127 MOORE
047129 MORGAN
047131 OBION
047133 OVERTON
047135 PERRY
047137 PICKETT
047139 POLK
047141 PUTNAM
047143 RHEA
047145 ROANE
047147 ROBERTSON
047149 RUTHERFORD
047151 SCOTT
047153 SEQUATCHIE
047155 SEVIER
047157 SHELBY
047159 SMITH
047161 STEWART
047163 SULLIVAN
047165 SUMNER
047167 TIPTON
047169 TROUSDALE
047171 UNICOI
047173 UNION

047175 VAN BUREN
047177 WARREN
047179 WASHINGTON
047181 WAYNE
047183 WEAKLEY
047185 WHITE
047187 WILLIAMSON
047189 WILSON

TEXAS

048000 STATE WIDE
048001 ANDERSON
048003 ANDREWS
048005 ANGELINA
048007 ARANSAS
048009 ARCHER
048011 ARMSTRONG
048013 ATASCOSA
048015 AUSTIN
048017 BAILEY
048019 BANDERA
048021 BASTROP
048023 BAYLOR
048025 BEE
048027 BELL
048029 BEXAR
048031 BLANCO
048033 BORDEN
048035 BOSQUE
048037 BOWIE
048039 BRAZORIA
048041 BRAZOS
048043 BREWSTER
048045 BRISCOE
048047 BROOKS
048049 BROWN
048051 BURLESON
048053 BURNET
048055 CALDWELL
048057 CALHOUN
048059 CALLAHAN
048061 CAMERON
048063 CAMP
048065 CARSON
048067 CASS
048069 CASTRO
048071 CHAMBERS
048073 CHEROKEE
048075 CHILDRESS
048077 CLAY
048079 COCHRAN
048018 COKE
048083 COLEMAN
048085 COLLIN

048087 COLLINGSWORTH
048089 COLORADO
048091 COMAL
048093 COMANCHE
048095 CONCHO
048097 COOKE
048099 CORYELL
048101 COTTLE
048103 CRANE
048105 CROCKETT
048107 CROSBY
048109 CULBERSON
048111 DALLAM
048113 DALLAS
048115 DAWSON
048117 DEAF SMITH
048119 DELTA
048121 DENTON
048123 DE WITT
048125 DICKENS
048127 DIMMIT
048129 DONLEY
048131 DUVAL
048133 EASTLAND
048135 ECTOR
048137 EDWARDS
048139 ELLIS
048141 EL PASO
048143 ERATH
048145 FALLS
048147 FANNIN
048149 FAYETTE
048151 FISHER
048153 FLOYD
048155 FOARD
048157 FORT BEND
048159 FRANKLIN
048161 FREESTONE
048163 FRIO
048165 GAINES
048167 GALVESTON
048169 GARZA
048171 GILLESPIE
048173 GLASSCOCK
048175 GOLIAD
048177 GONZALES
048179 GRAY
048181 GRAYSON
048183 GREGG
048185 GRIMES
048187 GUADALUPE
048189 HALE
048191 HALL
048193 HAMILTON

048195 HANSFORD
048197 HARDEMAN
048199 HARDIN
048201 HARRIS
048203 HARRISON
048205 HARTLEY
048207 HASKELL
048209 HAYS
048211 HEMPHILL
048213 HENDERSON
048215 HIDALGO
048217 HILL
048219 HOCKLEY
048221 HOOD
048223 HOPKINS
048225 HOUSTON
048227 HOWARD
048229 HUDSPETH
048231 HUNT
048233 HUTCHINSON
048235 IRION
048237 JACK
048239 JACKSON
048241 JASPER
048243 JEFF DAVIS
048245 JEFFERSON
048247 JIM HOGG
048249 JIM WELLS
048251 JOHNSON
048253 JONES
048255 KARNES
048257 KAUFMAN
048259 KENDALL
048261 KENEDY
048263 KENT
048265 KERR
048267 KIMBLE
048269 KING
048271 KINNEY
048273 KLEBERG
048275 KNOX
048277 LAMAR
048279 LAMB
048281 LAMPASAS
048283 LA SALLE
048285 LAVACA
048287 LEE
048289 LEON
048291 LIBERTY
048293 LIMESTONE
048295 LIPSCOMB
048297 LIVE OAK
048299 LLANO
048301 LOVING

048303 LUBBOCK
048305 LYNN
048307 MCCULLOCH
048309 MCLENNAN
048311 MCMULLEN
048313 MADISON
048315 MARION
048317 MARTIN
048319 MASON
048321 MATAGORDA
048323 MAVERICK
048325 MEDINA
048327 MENARD
048329 MIDLAND
048331 MILAM
048333 MILLS
048335 MITCHELL
048337 MONTAGUE
048339 MONTGOMERY
048341 MOORE
048343 MORRIS
048345 MOTLEY
048347 NACOGDOCHES
048349 NAVARRO
048351 NEWTON
048353 NOLAN
048355 NUECES
048357 OCHILTREE
048359 OLDHAM
048361 ORANGE
048363 PALO PINTO
048365 PANOLA
048367 PARKER
048369 PARMER
048371 PECOS
048373 POLK
048375 POTTER
048377 PRESIDIO
048379 RAINS
048381 RANDALL
048383 REAGAN
048385 REAL
048387 RED RIVER
048389 REEVES
048391 REFUGIO
048393 ROBERTS
048395 ROBERTSON
048397 ROCKWALL
048399 RUNNELS
048401 RUSK
048403 SABINE
048405 SAN AUGUSTINE
048407 SAN JACINTO
048409 SAN PATRICIO

048411 SAN SABA
048413 SCHLEICHER
048415 SCURRY
048417 SHACKELFORD
048419 SHELBY
048421 SHERMAN
048423 SMITH
048425 SOMERVELL
048427 STARR
048429 STEPHENS
048431 STERLING
048433 STONEWALL
048435 SUTTON
048437 SWISHER
048439 TARRANT
048441 TAYLOR
048443 TERRELL
048445 TERRY
048447 THROCKMORTON
048449 TITUS
048451 TOM GREEN
048453 TRAVIS
048455 TRINITY
048457 TYLER
048459 UPSHUR
048461 UPTON
048463 UVALDE
048465 VAL VERDE
048467 VAN ZANDT
048469 VICTORIA
048471 WALKER
048473 WALLER
048475 WARD
048477 WASHINGTON
048479 WEBB
048481 WHARTON
048483 WHEELER
048485 WICHITA
048487 WILBARGER
048489 WILLACY
048491 WILLIAMSON
048493 WILSON
048495 WINKLER
048497 WISE
048499 WOOD
048501 YOAKUM
048503 YOUNG
048505 ZAPATA
048507 ZAVALA

UTAH
049000 STATE WIDE

049001 BEAVER
049003 BOX ELDER
049005 CACHE
049007 CARBON
049009 DAGGETT
049011 DAVIS
049013 DUCHESNE
049015 EMERY
049017 GARFIELD
049019 GRAND
049021 IRON
049023 JUAB
049025 KANE
049027 MILLARD
049029 MORGAN
049031 PIUTE
049033 RICH
049035 SALT LAKE
049037 SAN JUAN
049039 SANPETE
049041 SEVIER
049043 SUMMIT
049045 TOOELE
049047 Uintah
049049 UTAH
049051 WASATCH
049053 WASHINGTON
049055 WAYNE
049057 WEBER

VERMONT

050000 STATE WIDE
050001 ADDISON
050003 BENNINGTON
050005 CALEDONIA
050007 CHITTENDEN
050009 ESSEX
050011 FRANKLIN
050013 GRAND ISLE
050015 LAMOILLE
050017 ORANGE
050019 ORLEANS
050021 RUTLAND
050023 WASHINGTON
050025 WINDHAM
050027 WINDSOR

VIRGINIA

051000 STATE WIDE
051001 ACCOMACK
051003 ALBEMARLE
051005 ALLEGHANY
051007 AMELIA
051009 AMHERST

051011 APPOMATTOX
051013 ARLINGTON
051015 AUGUSTA
051017 BATH
051019 BEDFORD
051021 BLAND
051023 BOTETOURT
051025 BRUNSWICK
051027 BUCHANAN
051029 BUCKINGHAM
051031 CAMPBELL
051033 CAROLINE
051035 CARROLL
051037 CHARLES CITY
051039 CHARLOTTE
051041 CHESTERFIELD
051043 CLARKE
051045 CRAIG
051047 CULPEPER
051049 CUMBERLAND
051051 DICKENSON
051053 DINWIDDIE
051057 ESSEX
051059 FAIRFAX
051061 FAUQUIER
051063 FLOYD
051065 FLUVANNA
051067 FRANKLIN
051069 FREDERICK
051071 GILES
051073 GLOUCESTER
051075 GOOCHLAND
051077 GRAYSON
051079 GREENE
051081 GREENSVILLE
051083 HALIFAX
051085 HANOVER
051087 HENRICO
051089 HENRY
051091 HIGHLAND
051093 ISLE OF WIGHT
051095 JAMES CITY
051097 KING AND QUEEN
051099 KING GEORGE
051101 KING WILLIAM
051103 LANCASTER
051105 LEE
051107 LOUDOUN
051109 LOUISA
051111 LUNENBURG
051113 MADISON
051115 MATHEWS
051117 MECKLENBURG
051119 MIDDLESEX

051121 MONTGOMERY
051125 NELSON
051127 NEW KENT
051131 NORTHAMPTON
051133 NORTHUMBERLAND
051135 NOTTOWAY
051137 ORANGE
051139 PAGE
051141 PATRICK
051143 PITTSYLVANIA
051145 POWHATAN
051147 PRINCE EDWARD
051149 PRINCE GEORGE
051153 PRINCE WILLIAM
051155 PULASKI
051157 RAPPAHANNOCK
051159 RICHMOND
051161 ROANOKE
051163 ROCKBRIDGE
051165 ROCKINGHAM
051167 RUSSELL
051169 SCOTT
051171 SHENANDOAH
051173 SMYTH
051175 SOUTHAMPTON
051177 SPOTSYLVANIA
051179 STAFFORD
051181 SURRY
051183 SUSSEX
051185 TAZEWELL
051187 WARREN
051191 WASHINGTON
051193 WESTMORELAND
051195 WISE
051197 WYTHE
051199 YORK
051510 ALEXANDRIA
051515 BEDFORD
051520 BRISTOL
051530 BUENA VISTA
051540 CHARLOTTESVILLE
051550 CHESAPEAKE
051560 CLIFTON FORGE
051570 COLONIAL HEIGHTS
051580 COVINGTON
051590 DANVILLE
051595 EMPORIA
051600 FAIRFAX
051610 FALLS CHURCH
051620 FRANKLIN
051630 FREDERICKSBURG
051640 GALAX
051650 HAMPTON
051660 HARRISONBURG

051670 HOPEWELL
051678 LEXINGTON
051680 LYNCHBURG
051683 MANASSAS
051685 MANASSAS PARK
051690 MARTINSVILLE
051700 NEWPORT NEWS
051710 NORFOLK
051720 NORTON
051730 PETERSBURG
051735 POQUOSON
051740 PORTSMOUTH
051750 RADFORD
051760 RICHMOND
051770 ROANOKE
051775 SALEM
051780 SOUTH BOSTON
051790 STAUNTON
051800 SUFFOLK
051810 VIRGINIA BEACH
051820 WAYNESBORO
051830 WILLIAMSBURG
051840 WINCHESTER

WASHINGTON

053000 STATE WIDE
053001 ADAMS
053003 ASOTIN
053005 BENTON
053007 CHELAN
053009 CLALLAM
053011 CLARK
053013 COLUMBIA
053015 COWLITZ
053017 DOUGLAS
053019 FERRY
053021 FRANKLIN
053023 GARFIELD
053025 GRANT
053027 GRAYS HARBOR
053029 ISLAND
053031 JEFFERSON
053033 KING
053035 KITSAP
053037 KITTITAS
053039 KLUCKITAT
053041 LEWIS
053043 LINCOLN
053045 MASON
053047 OKANOGAN
053049 PACIFIC
053051 PEND OREILLE
053053 PIERCE
053055 SAN JUAN

053057 SKAGIT
053059 SKAMANIA
053061 SNOHOMISH
053063 SPOKANE
053065 STEVENS
053067 THURSTON
053069 WAHIAKUM
053071 WALLA WALLA
053073 WHATCOM
053075 WHITMAN
053077 YAKIMA

WEST VIRGINIA

054000 STATE WIDE
054001 BARBOUR
054003 BERKELEY
054005 BOONE
054007 BRAXTON
054009 BROOKE
054011 CABELL
054013 CALHOUN
054015 CLAY
054017 DODDRIDGE
054019 FAYETTE
054021 GILMER
054023 GRANT
054025 GREENBRIER
054027 HAMPSHIRE
054029 HANCOCK
054031 HARDY
054033 HARRISON
054035 JACKSON
054037 JEFFERSON
054039 KANAWHA
054041 LEWIS
054043 LINCOLN
054045 LOGAN
054047 MCDOWELL
054049 MARION
054051 MARSHALL
054053 MASON
054055 MERCER
054057 MINERAL
054059 MINGO
054061 MONONGALIA
054063 MONROE
054065 MORGAN
054067 NICHOLAS
054069 OHIO
054071 PENDLETON
054073 PLEASANTS
054075 POCAHONTAS
054077 PRESTON
054079 PUTNAM

054081 RALEIGH
054083 RANDOLPH
054085 RITCHIE
054087 ROANE
054089 SUMMERS
054091 TAYLOR
054093 TUCKER
054095 TYLER
054097 UPSHUR
054099 WAYNE
054101 WEBSTER
054103 WETZEL
054105 WIRT
054107 WOOD
054109 WYOMING

WISCONSIN

055000 STATE WIDE
055001 ADAMS
055003 ASHLAND
055005 BARRON
055007 BAYFIELD
055009 BROWN
055011 BUFFALO
055013 BURNETT
055015 CALUMET
055017 CHIPPEWA
055019 CLARK
055021 COLUMBIA
055023 CRAWFORD
055025 DANE
055027 DODGE
055029 DOOR
055031 DOUGLAS
055033 DUNN
055035 EAU CLAIRE
055037 FLORENCE
055039 FOND DU LAC
055041 FOREST
055043 GRANT
055045 GREEN
055047 GREEN LAKE
055049 IOWA
055051 IRON
055053 JACKSON
055055 JEFFERSON
055057 JUNEAU
055059 KENOSHA
055061 KEWAUNEE
055063 LA CROSSE
055065 LAFAYETTE
055067 LANGLADE
055069 LINCOLN
055071 MANITOWOC

055073 MARATHON
055075 MARINETTE
055077 MARQUETTE
055078 MENOMINEE
055079 MILWAUKEE
055081 MONROE
055083 OCONTO
055085 ONEIDA
055087 OUTAGAMIE
055089 OZAUKEE
055091 PEPIN
055093 PIERCE
055095 POLK
055097 PORTAGE
055099 PRICE
055101 RACINE
055103 RICHLAND
055105 ROCK
055107 RUSK
055109 ST CROIX
055111 SAUK
055113 SAWYER
055115 SHAWANO
055117 SHEBOYGAN
055119 TAYLOR
055121 TREMPLEAU
055123 VERNON
055125 VILAS
055127 WALWORTH
055129 WASHBURN
055133 WAUKESHA
055135 WAUPACA
055137 WAUSHARA
055139 WINNEBAGO
055141 WOOD

WYOMING

056000 STATE WIDE
056001 ALBANY
056003 BIG HORN
056005 CAMPBELL
056007 CARBON
056009 CONVERSE
056011 CROOK
056013 FREMONT
056015 GOSHEN
056017 HOT SPRINGS
056019 JOHNSON
056021 LARAMIE
056023 LINCOLN
056025 NATRONA
056029 PARK
056031 PLATTE
056033 SHERIDAN

056035 SUBLETTE
056037 SWEETWATER
056039 TETON
056041 UINTA
056043 WASHAKIE
056045 WESTON